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A single religion is believed to have bound primitive Indian tribes in a loose confederacy, extending from the Gulf of Mexico to Ontario, with its centre in the Ohio Valley. Shown here, in Adams County, Ohio, is the Great Serpent Mound so important to this group. A similar serpent idol was constructed at Rice Lake.

U.S. Army

Serpent on the Hill: The Story of a Sacred Grove

by EDMUND CARPENTER

A GREAT SNAKE constructed of earth and rocks on a hill overlooking Rice Lake, Ontario, has baffled a generation or more of archaeologists. The mystery concerns the monument's origin, and this in turn the entire question of Ontario prehistory.

What clues we have offer a strange tale out of the past — the story of a sacred grove where forgotten gods were worshipped before the birth of Christ. Like all true stories, it is difficult to tell because the threads are many and lead to strange places and even stranger beliefs.

The story begins way back, some 35,000 years ago when arctic nomads crossed Bering Strait, either by land or water, to hunt the herds of the New World. To us now, this seems a dramatic and significant happening, but it is doubtful if these hunters ever guessed they had discovered a new land. It was probably just more of that great white expanse they already knew so well.

Having lived among the Eskimos, I do not find it difficult to imagine that first crossing.

It was probably a day like today, clear and brisk, when a few small boats groped along the coast looking for a wintering spot that offered shelter. Finally came the moment when the husband made his decision, and the family, with its tired children, disembarked to choose a camping ground for their first night in America.

Others followed, established small settlements and then slowly spread across the arctic belt, neither pursuing nor being pursued, but simply existing, the sons sometimes hunting beyond the range of their fathers but never really leaving home. Gradually they peopled arctic America. Some filtered south. We know little about these movements but we are certain they involved great time spans and that infiltrations from Asia—new people, new ways—continued.

Like the plant and animal population, these hunters ranged to and fro with the shifting climate at the end of the Pleistocene Period — advancing northward when the ice sheets retreated, withdrawing southward when the arctic cold briefly returned. Once in the tree

Delicately chipped "Yuma" projectile points from southern Saskatchewan, made by some of Canada's earliest residents. These hunters pursued the great herds on the Plains and followed them east, perhaps 7,000 to 10,000 years ago when conditions in the west became arid. They probably enjoyed as nearly a condition of free wandering in search of food in a sparsely populated country as has ever existed in human history.

Royal Ontario Museum

belt and then in the grasslands farther south, they encountered herds of camels, elephants, horses and several antelopes. Their pursuit of these far-ranging animals carried them to southern South America without the necessity of great localized adaptation, so that within a few thousand years both continents were sparsely populated. Then, for reasons we do not know, these animals suddenly became extinct and the movement of hunters was restricted. Each local group adapted to the environment in which it found itself.

We know these people from the things they made, rather than from their skeletons, for we have yet to discover human bones that date, of certainty, from this early time. There have been many candidates, yet all have failed to pass the acid test of scientific acceptability. But the characteristic features of these early hunters were probably not unlike those of modern Indians, the friendly faces that greet us on reservations today.

Many must have taken real pride in tool-making. One group delicately chipped flint spears and then fluted them for hafting, an art unknown to later peoples. Some of these darts have been found embedded in the bones of long extinct mammals. Another group chipped symmetrical, longitudinally flaked javelin points; others made tiny blades in a way we understand but cannot duplicate. And some took coarse quartzite, which they quarried on Manitoulin Island, and shaped it into fine tools.

Not all of them lavished such care on their tools. On a bay on Lake Nipissing, an archaeologist named Frank Ridley dug a stratified site, a veritable layer cake of ancient deposits piled one on top of the other. In the bottom-most layer, the oldest, he found tools of the rudest sort. But this should not surprise us. We are dealing here with thousands of years and the sweep of two continents. It was an open land and a simpler time when a man might, at the beckoning of some strange cloud, set forth into the wilderness to establish new ways. There was room for many cultures.

Centre:—Quartzite knife obtained from glacial deposits of great antiquity at Sheguiandah, Manitoulin Island, Ontario.

National Museum of Canada

At bottom:—Quartzite projectile point, 7,000 to 9,000 years old, probably used with throwing stick, from Sheguiandah, Manitoulin Island, Ontario.

National Museum of Canada





Crude knife blades and projectile points from an ancient site of hunting-fishing nomads at the Narrows, Lake Abitibi, northern Ontario. Excavated by Mr. Frank Ridley.

At no place in Canada is it easier to imagine the daily life of these ancient hunters than at the Lake Nipissing camp: small shelters of bark and skin set back on the low beach, women suckling babies or plucking nits from their children's heads, young boys throwing stones at a barking dog, while all await a hunting party held up by the wind on the lake. There is a natural seat on a high rock outcropping that thrusts out into the water. Over the thousands of years that this camp was sporadically occupied, how many women sat there, looking far up the lake, awaiting their husbands' return?

When the remnants of the last ice-sheet had wasted away, warmer more humid conditions prevailed and the land, once heavy with coniferous darkness, saw light break through forests of mixed hardwoods and evergreens. Into this country of shallow lakes and clear streams came a long-headed folk with narrow faces. We do not know where they came from, but we know when they arrived. A method for estimating the antiquity of organic remains has been discovered — a powerful aid in the hands of those who are trying to recollect the

past. In constant conditions Carbon 14 in charcoal or bone disintegrates at a steady rate and so provides a kind of non-mechanical clock which has been keeping time through tens of thousands of years. Reading this clock has shown that these invaders arrived over 5,000 years ago, coming from a distant region, bringing with them new ways. They were hunters, fishers and gatherers of shellfish, snails, wild vegetables and other foods. Much of their food they took from the water with barbless bone fish-hooks, nets, and set-lines with baited gorges which caught in the gullet of the fish. Somehow they learned how to remove the poison from acorns, and these nuts, pulverized in shallow mortars, became a staple food.

Knowing nothing of pottery, they followed the ancient cooking method of dropping heated stones into containers of bark, skin or basketry to boil food, while large pieces of meat were roasted on beds of fire-stones, and meat and fish were dried in large spreads of ashes. Fires were kindled by striking flint against iron pyrites or fool's gold. None of their clothing has survived, but the presence of a true, eyed bone needle suggests garments of tailored skins. Their most distinctive tool was a polished adze, bevelled on top. I have one before me as I write — ancient helper of a lonely hunter, nowadays debased into a paper-weight, symbol of the office-worker.

For centuries, while the climate became warmer and drier, they roamed this land, never numerous like their kin south of Lake Ontario, but surviving, grandsons succeeding grandfathers. Gradually they were replaced — first through hostilities and later intermarriage — by descendants of an early wave of population out of Asia, stocky people with broad heads and wide faces who fished and netted from dug-outs and hunted with the spear-thrower, a wooden instrument, still used by the Eskimos, which extends the arm so a javelin can be hurled with force and precision. They waded the rapids to harpoon salmon and pike, boated over shallow river pools, and fished with heavy sinkers.

Some, but little, care was shown in the burial of the dead; most were simply dumped



Rock carvings at Stoney Lake, near Peterborough, Ontario.

Alex Gray

into open pits. I do not mean to imply that they lacked religious beliefs; but like many of the very primitive groups today, they probably believed in reincarnation and hence were little concerned with the after-life. Yet they left imperishable evidence of their spiritual beliefs —

Picasso-like carvings, chiselled deep into rock by hunters giving thanks to spirit helpers.

The meaning of these carvings is not difficult to guess. For the custom survived down into historic times among the Algonkian Indians, whose young men went into the wilderness and



Prehistoric copper spear, spatula and axe from Ontario. The copper was mined in the Lake Superior region and beaten cold into shape.

Royal Ontario Museum

fasted in quests for guardian spirits. A youth seeking visions and insight went apart from his fellows and lived for a time in the wilderness. If he was of the proper sort, he would return with a message from the god he had set out to seek; but even if he failed in that particular, he would have had a vision or seen a marvel — and these were always worth listening to and thinking about. Usually some animal or voice appeared to the suppliant, bestowing power upon him. In thanks for services rendered, the hunter then carved or painted the likeness of his dream-helper or of the animal he sought to kill: birds, moose tracks, snakes and forgotten symbols. Without exception, the rocks he chose were in inaccessible places — true

sanctuaries. Spells cast there must have been thought especially effective.

During this time there appeared hunters from the Wisconsin area with tools that must have amazed these stone-age men. Tools of copper! One of these hunters camped on Farquar Lake, near Haliburton. Perhaps he had come to trade, for he carried a bag with nearly one hundred shiny spears, awls, knives, chisels and beads, all mined in Upper Michigan and beaten into shape. Yet he hid them in the sand and then, for reasons we shall never know, did not return.

This was a hard land, cruel at times. A traveller's return must always have been in doubt. We have found the bones of what

appeared to be a family, tortured and slain. And even those who died from natural causes rarely died in peace, for many suffered from arthritis and abscess formation, induced by gritty food. Life expectancy was short.

It is astonishing to find a well-developed copper industry in northern America thousands of years ago. Yet it did exist, though by the time Rice Lake's Serpent Mound was built copper was used mostly for ornaments and religious paraphernalia. Tools continued to be made of stone.

Though these hunters had heavy axes, capable of felling and shaping timber, the mark they made on the face of Canada must have been slight. A few trees cut, extending here and there to a small clearing; boats moving on the rivers and along the shores; some huddles of low shelters. Sites were occupied briefly and abandoned; the forest returned and the few broken tools that remained were quickly covered by forest duff.

Turning away from Canada to see the continent as a whole, it is plain that these encampments were already backward, their way of life no longer the only way known in America. Corn had been domesticated far to the south. Slowly, over hundreds of years, the elementary ideas of a farming economy spread up the Mississippi to the Great Lakes, everywhere changing not only the cultures it met, but the land itself.

Working where conditions were manageable, in the relatively open areas, the new farmers set themselves to begin the domestication of the land. They felled trees and burnt undergrowth. And they planted the first seeds. Two thousand years later Father Sagard wrote that it was easier to get lost in the cornfields of the Hurons than in the deep forest.

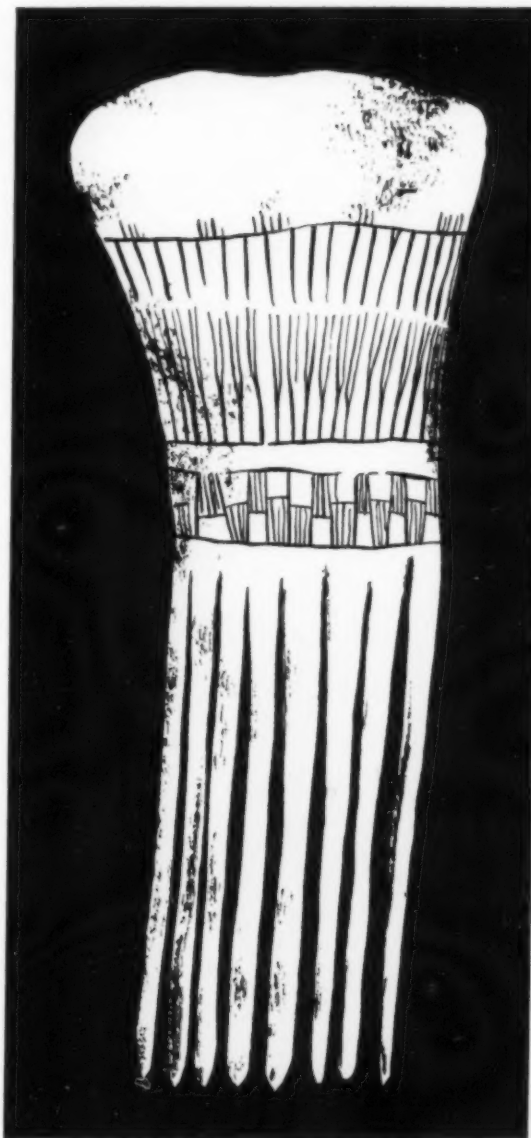
The early hunters had studied the habits of their fellow creatures—the routes of the deer, the spring and autumn flights of geese. With snares and fish traps, nets and javelins, they claimed their tithe of this natural harvest. But they never dominated the land.

The Hopewellians were humble enough; they could not foresee how their successors would cut raw gaps in the forest, but they came with an additional equipment of conscious purpose

and will. Among the first farming families who came up from the south, with the men hunting along the way, no woman could have dreamt of the power that lay in her pouch of kernels. Yet those kernels were destined to change not only the face of the land but also the role of women, to start that long chain that culminated in the matriarchy of the Iroquois.

They (archaeologists call them Hopewellians) came from the rolling hill country of Ohio and entered Canada by way of the Niagara Peninsula. At least two earlier farming groups had preceded them, but it was the Hopewellians who left their mark.

They could not have arrived at a more



Engraved antler comb, over ten inches long, from grave near Port Maitland, Ontario.

Royal Ontario Museum



Left:—Platform pipe of greenish black steatite from grave near Port Maitland, Ontario.

Royal Ontario Museum

Below:—Slate birdstones from prehistoric Ontario sites. These may have been used as ornaments or employed as balancing weights on spear throwers.

Royal Ontario Museum

opportune time. Traditions from the south and from the far north-west, ultimately Asia, had at this very moment combined to produce an extraordinary culture in Ohio. Settlements were larger and more permanent, ornaments commoner, household gear larger. The hunter now had the bow; his wife, her small, irregular and probably impermanent garden patch. Both had leisure. Some of her time was spent in making pottery vessels, crude at first, but soon delightfully decorated. The designs were often age-old, at their simplest somewhat rubbed and worn repetitions of forms



that had stirred the imagination and feeling of generations. There was an accepted vocabulary of motifs, but a woman's pottery was often of a fresh, creative order. Her art lay in giving these designs new life by improvisations upon them, but not departing from (not destroying) the art itself. She was a composer, not merely a performer, a composer of variations upon known themes.

Her husband was no less an artist. As a carver in stone and horn and a worker of shell and copper, he had few rivals. Two noteworthy pieces came from a grave along the north shore of Lake Erie. Beside the skeleton of a man lay an enormous smoking pipe, delicately shaped from stone, and next to it a comb of antler, larger and more graceful than that of a *señorita*.

There was time for trade and travel, for trips to the copper mines on Lake Superior or, best

Left:—Charred beans, seeds, corn and nuts from a prehistoric village site in south-western Ontario.

Royal Ontario Museum

of all, to the great Hopewellian cities and ceremonial centres in Ohio. A single religion bound varied tribes into a loose confederacy that stretched from the Gulf of Mexico to Ontario, with its religious centre in the Ohio Valley. To the rural Ontario folk, Ohio must have seemed the very centre of the universe.

On trips there they would see great ceremonial earthworks and burial mounds. On the banks of the Little Miami River there were some that stretched for over a mile. One was an oval enclosure 1,500 feet long, surrounded by an earthen wall twenty feet broad. At one end was a gate; at the other, a graded road 600 feet long, which led to a circular platform 500 feet in diameter and surrounded by a great wall. These were not fortifications, but sacred enclosures. It is interesting to note that some of the dance patterns of the modern Iroquois resemble these patterns constructed of earth.

Certainly the visitors from the north did not leave without first visiting the Great Serpent Mound, high above the meeting of the Little Miami and the Ohio Rivers. Here lay the snake god, 1,330 feet long, swallowing a huge egg. It is not known what ceremonies were performed here or what beliefs were held. It can only be said that they were of such importance

to the Hopewellians that years of labour and planning went into the construction of that snake.

Undoubtedly there were privileged classes of people, priests and rulers, special guilds of craftsmen, and a social organization capable of directing co-operative labour — all new to the Ontario visitors, who must have marvelled at the elaborate rituals, the wealth, the strange dress and goods of the traders who filled the markets. Here were sheets of mica from the Carolinas, lead crystals from Missouri, grizzly bear teeth and obsidian from the Rockies, shells and sharks' teeth from the Gulf, banded slate and copper brought by the Canadians, gold from Mexico, and religious paraphernalia, some of which the travellers took home with them. Those markets must also have been filled with other things, many of which have not survived: finely woven cloth, carved bowls and dippers of wood, fresh garden produce and fruits and nuts from the forest.

But the thing that must have impressed these visitors — over-awed them, crept into their bones — was the cult of the dead, that preoccupation with after-life that permeated every thought of these people and dominated their lives. This, too, was taken home by the travellers.

In the foreground, outlined by white markers, is a small burial mound which covered seventeen skeletons. Behind is the exposed head of the Serpent Mound, Rice Lake, which also contained burials. The Royal Ontario Museum, assisted by the Serpent Mounds Foundation, has begun the painstaking task of exploring and restoring these tumuli, while the Ontario Department of Lands and Forests is developing the area into one of Canada's finest parks.





Left:—Ornament of sheet copper, probably representing the head of a serpent, made by Hopewell Indians of Ohio.

Below:—Effigy tobacco pipe of stone, carved to represent a duck on the back of a fish. The bowl of the pipe is in the back of the duck and the head of the fish is the mouthpiece. It was used by Hopewell Indians of Ohio.



The Ohio garden plots produced enough corn, squash and beans to support large populations, but not so large as to lead to overcrowding and warfare. Prehistoric North American culture probably reached its greatest height, its most sensitive pitch, at this time. With the domestication of plants, men had triumphed: the land was theirs, but had not yet been subjected and outraged. Wilderness was no longer in control, a master who could give or withhold, but now simply a source of extra food. Travel and trade bound the land in a friendly unity, but were not yet so easy as to

Eagle's foot of mica, from an Ohio burial mound of the Hopewell Indians.

destroy locality and the natural freedom of the individual that remoteness freely gives. Hunting and farming enjoyed a moment of balance, together serving the people's needs.

Small groups of Hopewellian farmers, perhaps on invitation, migrated to Ontario, settling among other places in the Rice Lake area, where they erected in a sacred grove high above the water another serpent idol. It must have required endless basketfuls of earth to construct this snake god, which is 190 feet long and five feet high. Today it stands in a magnificent grove of ancient oaks near the crest of the promontory with a ten-mile view in three directions. In front of the serpent's head (which itself contained burials) is a large egg-like mound, also of earth, and surrounding it are five ancient burial mounds. When a breeze off the lake ripples the grass on the



SERPENT ON THE HILL: THE STORY OF A SACRED GROVE

serpent's back, making it writhe, the snake seems to crawl right up the hill toward the egg.

I think I can picture how that snake was built. About twenty years ago in Georgia I saw a crew of some 200 Negroes dismantle an ancient mound, the men shovelling earth into baskets held high on the women's backs by tump-lines, and the women singing as they slowly walked down between trees hung with Spanish moss.

The Serpent Mound at Rice Lake was one of the sacred groves of the northern Hopewellians, but few people actually lived there. Most were scattered in camps miles apart, where often they erected private mounds for their dead. They were never numerous and their tools are often hard to distinguish from those of their neighbouring kin, with whom they had traded for centuries. But they remained foreign settlers, clinging tenaciously to the traditions of their forefathers. Perhaps they felt a responsibility to see that the rites were properly performed in this northern outpost and felt a smug superiority in the presence of provincial bumpkins. They must have proselytized, but the evidence suggests they were never very successful, at least in winning numbers.

They constructed the Serpent, erected burial mounds and cremated their dead. Possibly these burnings took place at night — illuminating the faces of the priests, casting gigantic shadows against the black oaks which reached up, hardly touched by the glare, and, with the sound of the waves against the shore below. When the heat had died away, the burnt bones were collected and buried in the mounds, each body resting in modest splendour, perhaps with copper, silver, and pearls.

From the scattered burial mounds on Rice Lake have come great copper axes and ear-spools, along with hundreds of beads of copper, shell, and silver. A pan-pipe of pure silver was discovered, as well as a large turtle effigy made from a conch shell. And from the village site at the water's edge and feast dumps of clamshells on the east bank have come tools and fragments of decorated pottery.

The village was small. Perhaps it was occupied only when services were held at the

Turtle shell effigy from a Hopewellian burial mound at Rice Lake, Ontario.

Royal Ontario Museum.



Richard Johnston, head of the Royal Ontario Museum field party, uncovering Burial Seven in the head of the Serpent Mound at Rice Lake.

P. Harrison



The "Egg" Mound at Rice Lake, Ontario.

P. Harrison

Serpent. But the heaps of clam-shells, in places several feet thick, cover large areas and suggest feasts attended by hundreds. They also suggest that to those people religion at times must have been fun. What the snake meant to them we may never know. My own guess is that the answer lies far to the south, in the direction from which corn came, where snake deities were worshipped at various times by tribes scattered from Tennessee to Mexico — the rattlesnake worshipped in the Natchez Temple of the Sun, the snake belonging in name and figure to the Aztec deity, Quetzacoatl, and so on.

In the mythologies of both the Iroquois and Algonkians there are giant snakes. But probably these do not relate to the Serpent Mound, and it is doubtful if any beliefs surrounding it survive. But other Hopewellian customs may. The complex social organization and the annual cycle of first-fruits ceremonies of the modern Iroquois, for example, are both southern. Were they introduced at this time? The Hopewellian chief often wore an antler headdress, sometimes of copper shaped like antlers. Today the Iroquois invest a chief with office by symbolically placing antlers on him. Were these northern Hopewellians some of the very distant ancestors of the modern Iroquois? Do the Iroquois of today owe at least a portion of their blood and traditions to the builders of the Serpent Mound? I think so, and so do others, but most anthropologists reserve judgment.

The Hopewellians were generally long-headed; physically they did not differ appreciably from later peoples in the area. They differed from earlier peoples, however, in two significant ways: they suffered from dental caries and possibly from syphilis, for some skeletons show bone lesions of a type considered indicative of this disease.



Hopewell man of Ohio. The head is enlarged from a clay figurine. The deer-antler headdress of copper, the pearl necklace, and the copper ear-spools were found in Ohio mounds.

Small effigies, found in Ohio, show how these people dressed. The women wore knee-length skirts that wrapped around their waists and fastened in back. They had robes of fur, dressed skin, or woven cloth, to which were fastened pearl beads and ornaments of copper and mica. Some of their cloth garments were painted with curvilinear designs, tan in colour and outlined in black on a red background.

The men had similar robes, but more lavishly decorated with ornaments and pearl beadwork. They wore breech-clouts, sometimes leggings, and woven sandals or skin moccasins. For ceremonial occasions there were breastplates of copper and even meteoric iron; large ear-spoons of copper, silver, or polished stone; metal bracelets; necklaces of shell, pearl, metal, and bear's teeth inlaid with pearls; and great pendants of slate and shell. The Hopewellians were the finest metalsmiths in native North America and they were no less accomplished carvers in stone and wood, reserving their finest talents for realistic effigy pipes.

At various times quantities of superb art work were taken out and destroyed — everything thrown into a heap and smashed. Art to them was a ritual act, not an object; it was the delight in making, not in owning.

There is no evidence that invaders wiped out these northern Hopewellians. The end was slower, perhaps sadder. Like a Roman outpost cut off from supplies and communications, this northern colony slowly faded out. The later mounds were small. Graves had fewer objects from Ohio, more objects of local manufacture, until toward the end mortuary offerings were pathetically shabby and few. Finally the religion disappeared. Later Indians showed little or no interest in the grave and after-life. Once more bodies were dumped into open pits.

Corn freed men from the constant uncertainties of the hunt, gave them leisure, time for music and art. But corn also destroyed this culture. As the population increased, so did the desire for land and warfare. The true centre of a people's interest and passion can fairly be judged by the nature of the buildings to which they devote most labour. With the later tribesmen it was not burial mounds and ceremonial earthworks, but palisaded fortifications — forts still to be found in our hills. Not only did the greatest communal labour go into building fortifications, but the skills of the men were now spent on the warpath. In the cemeteries we encounter a paradox: on the one hand, bodies tortured and slain, sometimes riddled

Disarticulate "bundle" burials in one of the small mounds beside the Serpent Mound at Rice Lake. Royal Ontario Museum excavation.

P. Harrison





Iroquois antler comb, with teeth missing, showing the practice of extended nursing which the early explorers described as common among the Huron and Five Nations Indians. Such nursing was probably, in the later years, of greater psychological than nutritional value.

Rochester Museum

effective co-operation every person in the group from birth to death. Then, suddenly and powerfully, 400 years ago, came the intrusion of the white man, with results so inevitable that they cannot be charged to the wills or even the mistakes of men. The newcomers could not see the patterns of each tribe; they smashed into them almost as innocently as men walk through a cobweb. And so the Indians lost all

with arrows; on the other hand, elderly cripples, obviously cared for over many years, a thing rarely found among the nomadic hunters.

In these overcrowded villages, some of enormous size, the women and children lived and planted, while the men hunted, fought, and engaged in diplomacy. The web of kinship and custom, with its double strands of blood and neighbourhood, knit together in intricate and

Right:—Iroquois ladle, made of antler.

Royal Ontario Museum



Below:—Erie pottery vessel from Ontario.

Royal Ontario Museum



Stone carving of a warrior with a wolf-headaddress, about 1620. This tiny head, which is less than one and three-quarter inches high, was discovered on a Huron village site by Mr. Frank Ridley of Toronto.

those essential, invisible things that give people unity, confidence and self-respect, and the habits, so hard to restore, of a disciplined social life. What they were offered, apart from the substitutes of free enterprise and Christianity, which only a few could fully attain, were material goods and incentives, disease and alcohol, and a bitter sense of having lost some indefinable but precious thing.

Some, like Pontiac, rebelled; but as Francis Parkman has shown, they could not stop, nor delay, the inevitable end: "We can well imagine with what bitterness of mood the defeated war-chief urged his canoe along the margin of Lake Erie, and gazed upon the horizon-bounded waters, and the lofty shores, green with primeval verdure. Little could he have dreamed, and little could the wisest of that day have imagined, that, within the space of a single human life, that lonely lake would be studded with the sails of commerce; that cities and villages would rise upon the ruins of the forest; and that the poor mementoes of his lost race — the wampum beads, the rusty tomahawk, and the arrowhead of stone, turned up by the plowshare — would become the wonder of schoolboys, and the prized relics of the antiquary's cabinet. Yet it needed no prophetic eye to foresee that, sooner or later, the doom must come."

For the hard-pressed Indians, the prospects of the future were as clear as they were calamitous. Destruction or civilization — between these lay their choice; and few who knew them could doubt which alternative they would embrace. Neither mound nor tablet now marks the burial-place of Pontiac. For a mausoleum, a city has risen above the forest hero; and the race whom he hated with such burning rancour

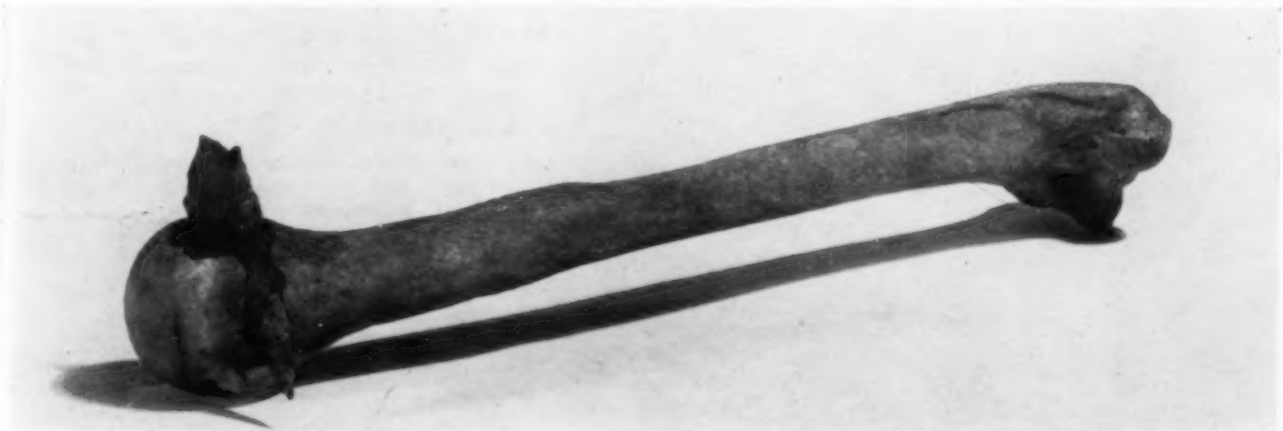


tramples with unceasing footsteps over his forgotten grave.

This is the story of the Serpent on the Hill. There are thousands of questions one yearns to ask, but the answers are few and still lie deep in the soil. As we change the face of Canada, we should listen carefully to these ancient records, for they can speak only once. Already the figure of the lonely hunter grows dim before our eyes. It would be regrettable to lose sight of him altogether.

Human bone perforated by arrow, found in Ontario.

Royal Ontario Museum





Wyoming-born Floyd Phillips is better known as "Panhandle" — a reminder of his cow-punching days in Texas. He pioneered ranching in central British Columbia some twenty years ago and took out Canadian citizenship papers. Blue-eyed, greying and affable, he is considered almost legendary by other members of the Cariboo Cattlemen's Association.

British Columbia Beef Drive

by RICHARD HARRINGTON

Photographs by the author.

SOME twenty years ago, a couple of cow-boys from Wyoming pushed their way to the end of the road west of Williams Lake, British Columbia, to Anahim Lake. From there they took to horseback, and explored the hinterland beyond. It was a land innocent of road or wagon trails, but a few Indian trails crossed it. Eventually they found the remote meadows they sought, as told by Richmond Hobson in his book *Grass Beyond the Mountains*.

Floyd "Panhandle" Phillips, one of those cow-boys, is still there, beyond the Itcha Mountains, sixty wagon-miles north of Anahim Lake over a trail he "swamped out". With his

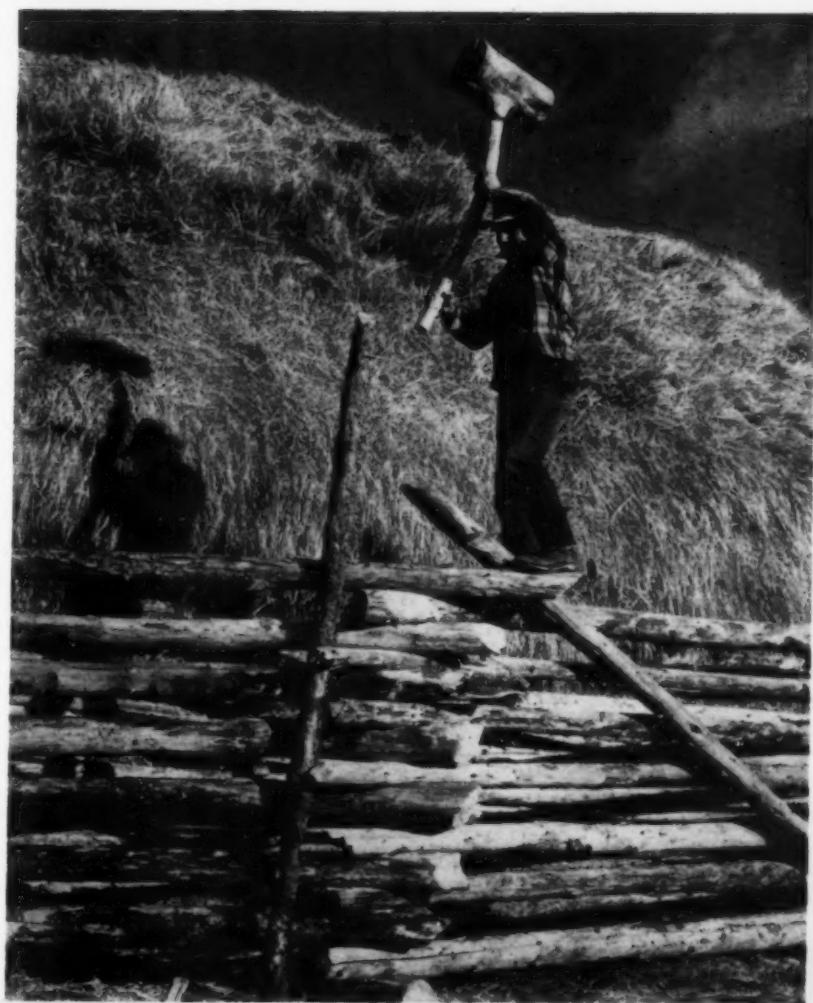
wife Betty, twelve-year-old son Willie, ten-year-old daughter Diana, and baby Robert, Pan Phillips is perfectly content with the life of the remotest rancher in the country.

Each October, he selects marketable cattle and herds them 200 miles eastward to the Quesnel Cattle Sales. The journey takes three weeks, barring accident or stampeding cattle. The cattle travel at a slow pace, to prevent loss of weight. If the weather is fine, the beef drive can be very enjoyable. It can be equally dreary when the high altitude brings snow, or grey skies pour down rain. But the Phillips family would not exchange their lives with the richest city-dweller.



Home Ranch, tucked in the midst of mountain ranges in central British Columbia, is one of the most difficult ranches to reach in Canada. It is sixty miles from the nearest store or post office by wagon trail over the Itcha Range. Here are shown the wide meadows that lured owner Floyd Phillips to this region. In the foreground are the root-cellar, storehouse, ranch house, and tool shed (formerly the ranch house).

Pan Phillips has to guard his precious hay against the lusty appetites of moose. There are many which like hay as well as the Hereford cattle like it. A special guard-rail at the base of the pole fence keeps them away. Pan drives in another post, using a mallet that was formerly part of a tree trunk. A man has to be ingenious so far from stores and neighbours.





Above:—

The youngsters turn quickly and easily from play to work. Pan and Willie help Betty Phillips in the vegetable garden, and Diana is about to join them by way of walking the rail fence. Turnips, carrots and potatoes grow well in the short season at Home Ranch.

Willie, twelve, and Diana, ten, get their correspondence lessons whenever anyone happens to be travelling past their home to Anahim Lake. Even more remote than Home Ranch are the villages of the Ulgatcho Indians, friendly men who use Pan's wagon trail to Anahim Lake.



Early in October Pan Phillips selects the cattle he wants to take to market, then the beef drive gets under way. It takes three weeks for the cattle to walk the 200 miles east to Quesnel, unhurried and picking up their food along the way. Betty Phillips and Willie start out in the wagon, which carries camping gear, repair equipment and town clothes.



Evening meal in camp. Diana has finished washing, Willie is scrubbing himself, Pan is feeding the baby his bottle, and Betty Phillips is slicing vegetables into the stew. Since the team and wagon travel faster than the beef herd, Betty breaks camp last in the morning and makes camp first in the evening, with the youngsters taking turns helping her.







Left top:—

The red and white Herefords move at a leisurely pace through the back-country and take time to feed whenever they reach a grassy meadow or slope. Aspens have turned to gold in the spruce and jack pine forest in this October scene. A beautiful lonesome country.

Left bottom:—

Following the cattle, Betty drives the wagon across the ford of a rushing brown stream. Pan's horse takes advantage of the opportunity to take a long drink. This is only one of many rivers that have to be crossed in the 200-mile trek.

At top:—

The beef drive reaches the abandoned Indian village of Kluskus, where only the Roman Catholic church remains in any state of preservation, though unused nowadays.



While at Kluskus, Phillips gives the cattle an extra day to rest and enjoy the nourishing grass of the terraced hillsides. In the meantime, he will shoe one of the horses. Lacking the usual ranch facilities for shoeing, he has to throw the horse. This calls for skill and special roping technique. Willie and Diana lend a hand, while the dog forms an excited audience.



Feet tied, and head held by photographer Richard Harrington, the horse gives up the struggle. Pan Phillips quickly pulls out horse-shoe nails and replaces a worn shoe.

The cattle drive to Quesnel climbs several ranges through the October countryside. Here the cattle crowd together on the wagon trail, pausing only to grab a mouthful of vetch here or a mushroom there. Willie follows on foot, for the pace of the cattle is only about ten miles a day, so riding becomes wearisome.



By mid-October one can expect snow in the high plateau of the Cariboo, and the cattle have more difficulty in gathering enough grass to sustain them. At this point the drive has reached the dirt road at Nazko. Here the British Columbia Forestry Service has established holding-grounds, where drovers can pen their cattle and feed them for one night.



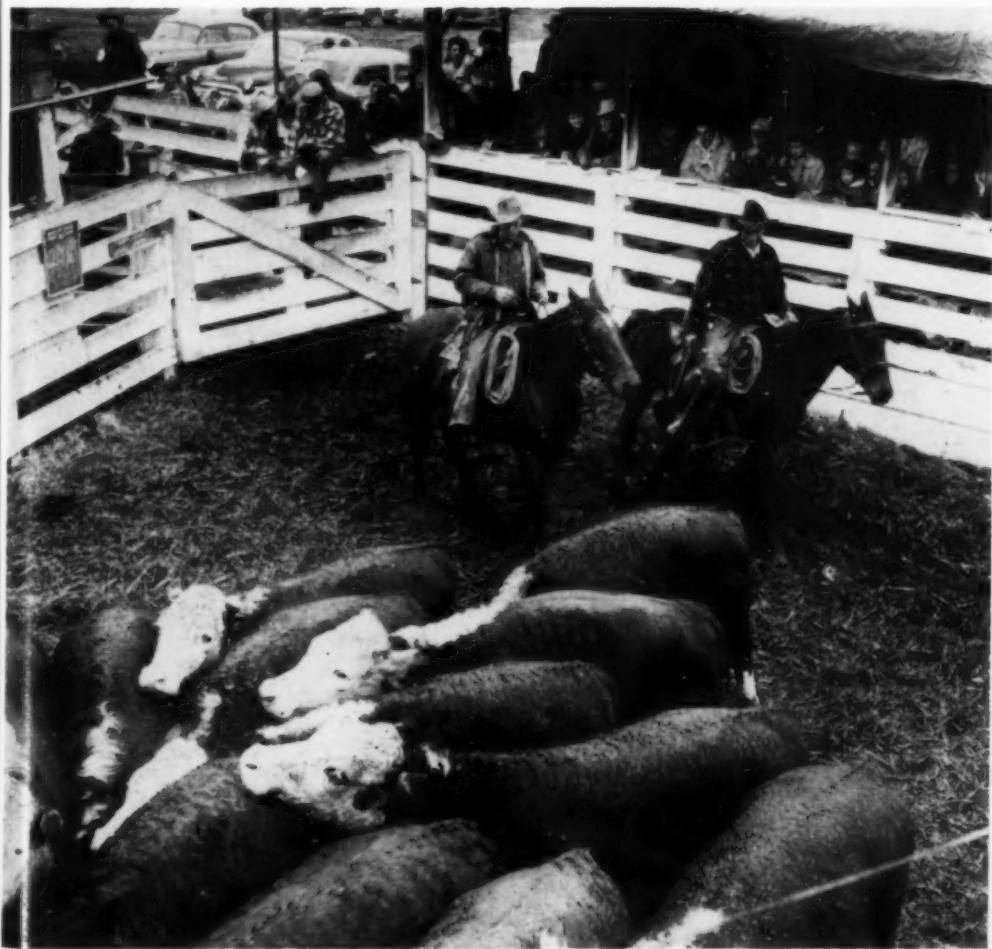


Riding, especially in a wet saddle, becomes tedious, and the feet at times feel like blocks of ice. Pan Phillips restores circulation by walking behind the cattle and leading his horse. Snowfalls are common on the beef drive, particularly when crossing mountains.

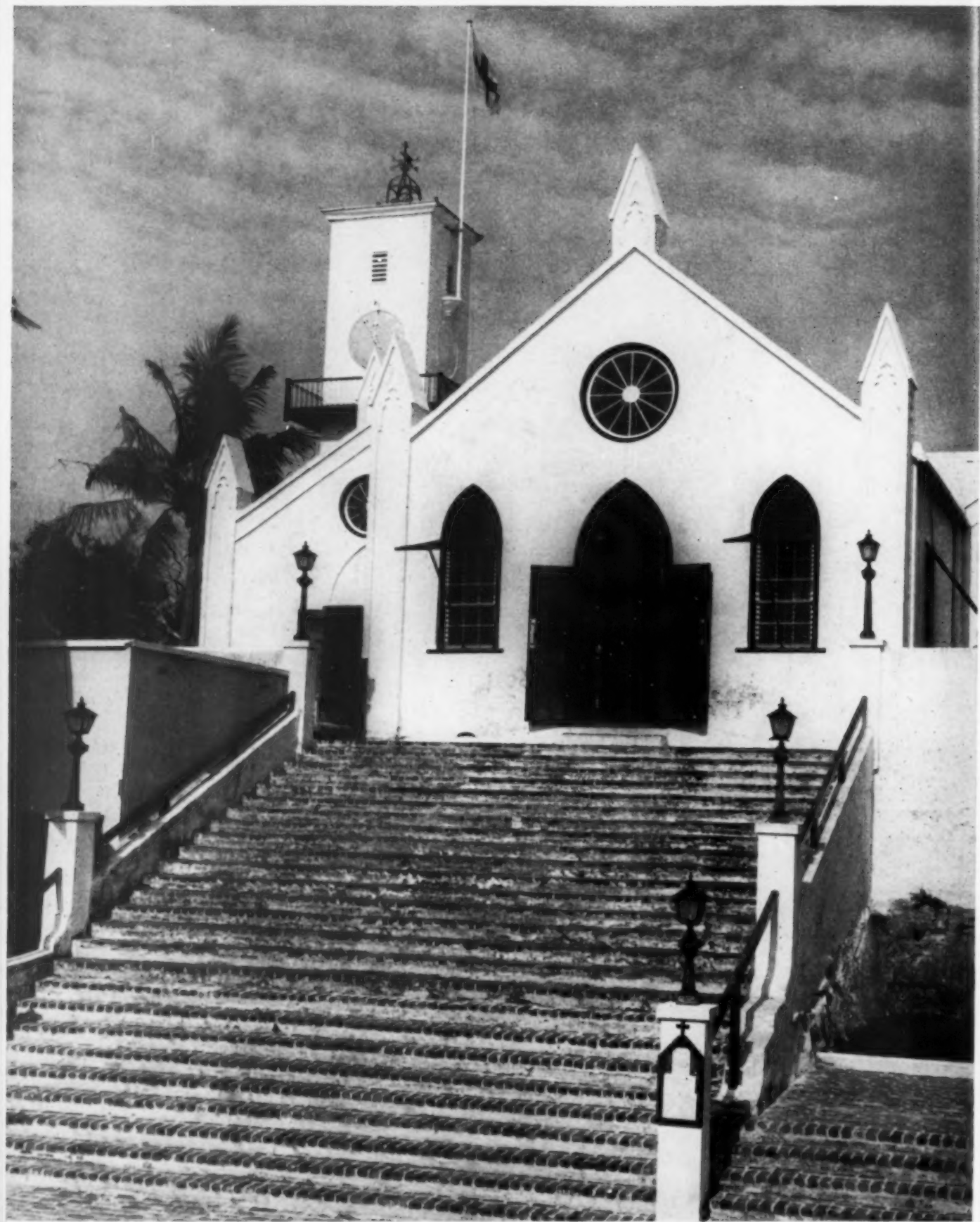


Snow slants down as a rancher adjusts the bridle of his pack-horse. The horse goes to Quesnel behind the cattle unloaded, but returns to the ranch with a full load of gear and groceries.

The last hazard of the beef drive is reached and almost over, for the cattle are nearly across the last wooden bridge, that across the Fraser River at Quesnel. The sound of their own hooves is enough to panic them, but the cowboys behind keep up a whooping that is even more alarming.



Safely in Quesnel in the cattle ring with buyers looking on, the cattle have reached the end of their long march. This is also the end of the year's work for Pan (on horseback at right).



Historic old St. George, once the capital of Bermuda, is said to be the oldest English-speaking community in the Western Hemisphere. Shown here is St. Peter's Church. The original structure was completed in 1612, when the colony was founded. The present building has examples of architectural work of the seventeenth, eighteenth, nineteenth and twentieth centuries. Its most celebrated treasure is the communion silver presented by Britain's King William III in 1678.

Bermuda Copes With Major Problems

by MARCUS VAN STEEN

Bermuda News Bureau photographs

ON THEIR FIRST VOYAGE to Acadia in 1604, Samuel de Champlain and the Sieur de Monts sighted the lonely Bermuda Islands, which have had an intimate relationship with Canada ever since. The tiny cluster of about 360 small islands first appeared on some maps about a century earlier, in 1503, and was given the name La Bermúdez in 1515 after the Spanish sea captain who is credited with being the first to locate it.

With so much land on this side of the ocean to explore, the Bermuda Islands with their total land area of twenty-two square miles were finally settled only by accident. In 1609 the English brig *Sea Venture* was wrecked on Bermuda's coral reefs, but in keeping with the kindly nature of the islands all on board managed to get safely ashore. This was not the first ship wrecked on these reefs, but the *Sea Venture* was different. On board it carried the newly-appointed Governor of Virginia, Admiral Sir George Somers, his deputy, Sir Thomas Gates, and 150 colonists bound for the new settlement in Virginia.

In true pioneering fashion the colonists set to work digging, planting, ship-building, and in ten months they set out once again in two ships laden with produce to complete their voyage. They found the colonists who had reached Virginia in a half-starved condition, their crops ruined, their spirits low. The crops grown in the soil of Bermuda literally saved the English settlement of Virginia from extinction.

Thus from the start Bermuda was an important part of the English-speaking civilization of North America. In many ways it was a fore-runner. Its first capital, St. George, is said to be the oldest English-speaking community in the Western Hemisphere, and it has enjoyed a form of British parliamentary government since 1620. The source spring is usually forgotten or overlooked when one views the broad imposing

river; but Bermuda is not so much overlooked in the massive activity of North America as misunderstood. Through tourist propaganda, it is becoming known to a growing multitude as a summery paradise remote from the cares and problems of the workaday world. This is not so, as the real Bermuda has its share of problems and anxieties in a changing world.

The Bermuda Islands lie east of the main current of the Gulf Stream, between 32°14' and 32°25' North latitude, and 64°38' and 64°52' West longitude. The islands cluster into a long thin crescent roughly resembling a fish-hook. A dozen of the larger islands are now connected by causeways and bridges to give the casual visitor the impression of one large island, some thirty miles long from tip to tip. With the nearest neighbouring land almost 600 miles distant, the first Europeans found the islands completely uninhabited, devoid of land animals, and with an extremely limited variety of plants. Only brackish water seeped through the limestone rock that forms the base of the entire group, but abundant rainfall kept the islands lush and verdant, and insect pests were few and relatively harmless.

Subsequent drastic changes that have been imposed on this picture have created problems, some of which are still far from being solved. Since the arrival of the first permanent settlers in 1612, the population has increased many times. Bermuda is one of the seven most thickly populated areas on the face of the earth, and the rate of population growth remains one of the highest in the world. The second major problem has resulted from the accidental introduction of insect pests, which have wrought a complete transformation in the appearance of the islands.

The first settlers found the land covered with the thick green foliage of the Bermuda cedar, *Juniperus bermudiana*, one of the very small number of plants native to these islands, and by far the most important. Up until a



The original foundations of Fort St. Catherine, just outside St. George, were laid in 1619. Today it is open to the public and guides wear authentic seventeenth century costumes. On either side of the fort are excellent beaches.

mere decade ago this was Bermuda's dominant tree. In the sheltered and more fertile valleys Bermuda cedars grew to a height of fifty feet or more, measuring in the region of twenty-four inches in diameter. In some districts they grew as thickly as 500 to an acre, and on all Bermuda's land area they averaged about 300 to the acre.

This thick cover of trees was very important to the early settlers on Bermuda. It was from cedar wood that Sir George Somers' colonists built the two ships that carried them on to Virginia. When the islands were finally settled a few years later, ship-building was the first industry, and it remained the most important for more than 200 years.

The first settlers realized the value of the Bermuda cedar and as early as 1627 a law was passed to conserve it. The development of the

colony took place, therefore, within a juniper forest. The trees cut for ship-building were for the most part cleared from land suitable for the cultivation of vegetables and other crops, with the cedars carefully preserved around the edges of the fields to act as wind-breaks — a very important function on these exposed islands. Anyone building a home would fell just enough trees to make room for it, leaving others standing closely around to give shade and privacy. In areas where excessive cutting occurred, natural reforestation took place, as the *Juniperus bermudiana*, like other junipers, produces an abundance of seeds and suitable conditions for germination and growth exist in Bermuda.

The climate of Bermuda, with its complete absence of frost and extreme heat, is favourable to practically every plant in the world. The

BERMUDA COPES WITH MAJOR PROBLEMS

soil is calcareous, from the disintegration of the native limestone, and in many places it is shallow; but with the careful use of fertilizer it may be made to produce two and even three crops a year.

So hospitable is the soil that nearly all the plants we have come to regard as Bermuda's own were originally introduced from elsewhere. The oleander that blooms in white, red and pink profusion along every roadside came from the Mediterranean area. The poinciana was introduced from Madagascar. The royal palm that crowns many a Bermuda view originated in the West Indies. Bermuda's famous Easter lilies came originally from China.

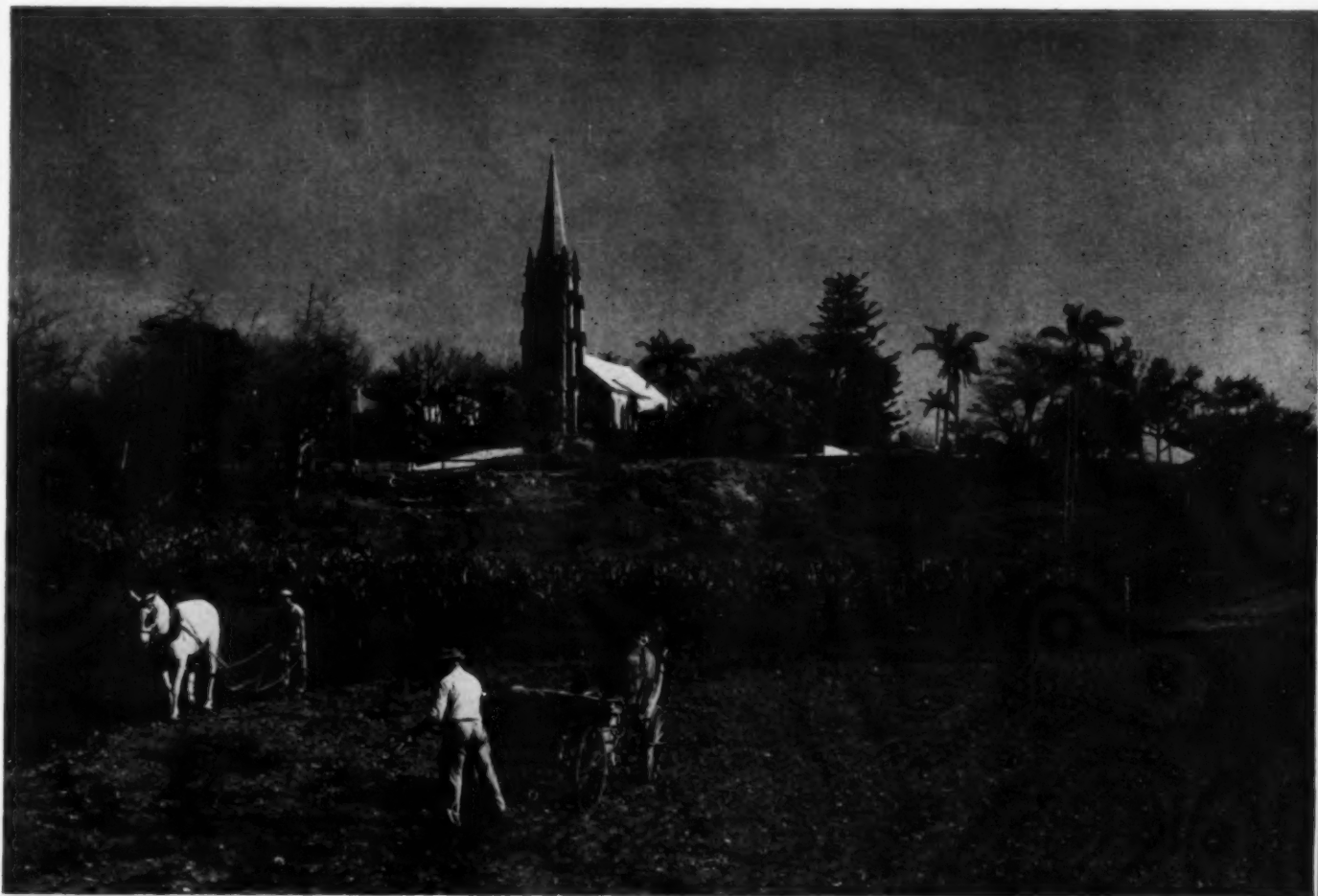
The same is true of all Bermuda's food crops. But so generously did they flourish in the mild climate and fertile soil of the islands that the colony became an exporter of food-stuffs at the very start of its history. Potatoes were grown by the first permanent settlers in 1612, and by 1621 20,000 pounds were being shipped to Virginia. Onions were introduced in 1616, and

Bermuda rapidly developed a species of its own that has been adopted by growers in other parts of the world.

Bananas, citrus fruits, and papayas, all flourish in Bermuda. During the nineteenth century it was an important exporter of potatoes, onions and arrowroot to the United States and Canada, and of oranges, grapefruit, lemons and bananas to London, Hamburg, New York, Montreal and elsewhere. What is more, these cargoes were carried in Bermuda bottoms, for the speedy and graceful Bermuda clippers were familiar sights on all the world's trade routes. Several hundreds of them were engaged in the North Atlantic carrying trade alone and were frequent visitors to Canada's Maritime ports.

At that time Bermuda was grouped along with the British North American colonies. Halifax and Bermuda were the twin bastions of Imperial defence in the Western Atlantic, and the Royal Navy squadron that spent the summer at Halifax wintered at the vast and elaborate base constructed during the course

The potatoes and onions of Bermuda were once famous exports, but tariff barriers made the trade unprofitable. Today farmers are encouraged to cultivate a variety of fruits and vegetables for the home market and Bermuda's many tourists.





The hospitable soil and climate favour the growth of almost every plant in the world. Many plants now regarded as native originated elsewhere, including the famous Easter lilies, which came from China. Lily blooms and lily bulbs are Bermuda's most important export today.

BERMUDA COPE WITH MAJOR PROBLEMS

of more than a century on the north-western islet of the Bermuda crescent called Ireland Island. Up until recently, Bermuda was part of the Roman Catholic archdiocese of Nova Scotia; at various time it was linked with the Anglican dioceses of Newfoundland and Nova Scotia. It still forms part of the Synod of the Presbyterian Church of the Maritime Provinces in Canada and the Maritime Conference of the United Church of Canada. During most of its history, officials, ecclesiastical dignitaries and businessmen have passed freely between Bermuda and Canada. The oldest newspaper in the colony was started by a newspaperman from Halifax. One of the founders of the Royal Bank of Canada was a banker from Bermuda. And so matters continued for many years, with Bermuda sharing fully in the economic expansion of North America.

The first sign of the coming change appeared in 1859, when the Mediterranean fruit fly was reported causing serious damage to the citrus trees. The pest probably was introduced by one of the many ships that called at the colony. In Bermuda's balmy climate and without any of its natural enemies, the destructive fly multiplied alarmingly, and was joined later by a scale disease that helped it to wipe out the islands' fruit export business by 1901.

By that time, too, Bermuda's great days of sail were ended. The coming of steam and iron ships, that sounded the death-knell for Nova Scotia's sailing vessels, brought about a similar change in Bermuda.

Another blow was directed at Bermuda's commerce by the McKinley Tariff Act of 1891, which sought to protect the Texas growers of so-called Bermuda onions by excluding the original variety. By 1920, however, Bermuda was still exporting 109,072 bushels of onions to United States and Canadian markets, along with 156,430 bushels of potatoes. The Smoot-Hawley tariff of 1930 removed most of the United States markets. The Bermuda growers, relying solely on Canada, added tomatoes and spring vegetables to their exports, but this business was finally terminated by the Canadian-United States tariff agreement of 1936, which granted tariff concessions for United States fruits and vegetables.

Bermuda's farmers gather their first harvest of potatoes and most other vegetables at Christmas, and another at Easter. In the case of carrots, turnips, peas and beans, they can get another crop by September. But in spite of this productivity, unfavourable tariff walls combined with a shortage of direct shipping accommodation kept Bermudian produce out of North American markets. After 1936, Bermuda's major export was lilies and lily bulbs. The Royal Navy base brought in important revenue. And to make up for lost exports, Bermuda started to cultivate her tourist business.

To accommodate the tourists, land that used to grow potatoes and onions was given over to luxury hotels, golf courses, tennis courts and flower gardens. To feed the growing number of tourists, Bermuda found herself becoming an importer, rather than an exporter, of food-stuffs.

This was the position in 1939 when the Second World War suddenly ended the tourist traffic and gradually reduced food shipments drastically. Bermuda once again had to start feeding herself, and once again the Bermudian people rose to the occasion with vigour and imagination.

Early in the war, the Chairman of the Board of Agriculture, Sir Howard Trott, organized the Planned Production Board, through which the Bermuda Government guaranteed primary producers a market at a fair price. The main purpose of this action was to give confidence and reassurance to the farmers, who had been disorganized and dispirited by the loss of overseas markets. The government, working through the experts at the Agricultural Experimental Station then headed by A. E. McCallan, saw to it that farm produce reached the consumer in a clean and fresh state and that the producer received a price that encouraged him to continue. During the war rationing had to be imposed on nearly all food items, but since the war the major control has been the banning of imports until domestic supplies are exhausted.

Instead of concentrating on a few crops for exports, Bermuda's farmers have been encouraged to grow a variety of fruits and vegetables for the home market, now considerably



*In the past ten years a scale disease has destroyed over ninety per cent of the "Bermuda cedars" (*Juniperus bermudiana*), but an extensive reforestation project has been undertaken by the government. These trees on Hamilton's Cedar Avenue have all been planted in the last few years.*

One of the colony's major achievements since 1939 has been its increase in milk production. Although Bermuda once imported almost all its milk, it is now able to produce about sixty per cent of what is required. One of the herds owned by the Pioneer Dairy.



Right:—The fruit industry of Bermuda is being carefully fostered and encouraged. View of a banana crop.

expanded by tourist traffic. In 1956, besides growing enough potatoes to do without imports for eight months, Bermuda produced important quantities of tomatoes, onions, beans, beets, broccoli, cabbages, carrots and sweet potatoes. Banana production has also been stimulated: with 130 acres producing two crops yearly, the annual yield now approaches the 100-ton mark, or more than one-half of the local demand. Another major achievement since 1939 has been the increase in milk production. Instead of having to import almost all of its milk, Bermuda is now able to produce almost 60 per cent of its own requirements.

The Second World War also saw the birth of the Citrus Growers Association, headed by the prominent businessman H. St. George Butterfield, and dedicated to the revival of citrus production in the colony. The Agricultural Experimental Station co-operates by sending crews out to spray the trees at the proper time and render advice and help when necessary. Now, with eighty-one acres under production, Bermuda is able to grow about one-third of its required grapefruit, oranges, limes and lemons. Bermuda's citrus fruits are juicy and very flavourful, and are worth the effort to revive them.

In the midst of this brave endeavour to restore its agriculture, Bermuda suffered another catastrophic change. This was the destruction of the distinctive Bermuda cedars by a scale infestation which denuded the entire colony of its beautiful green canopy within a few years. Prior to this, the Bermuda cedar had been singularly free from insect pests. However, in 1944 the oyster-shell scale and the juniper scale were reported in different parts of the colony, and within ten years 90 per cent of the cedars in Bermuda were standing bare and dead in spite of all efforts, including the help of the Commonwealth Institute of Biological Control which sent a team of scientists from Canada to try to bring the scale under control. Gordon Groves, the present Director of Agriculture, believes that the few remaining

Centre:—Bermuda produces about one-third of the fruit it requires. Close-up of Bermuda bananas.

At bottom:—The colony produces juicy flavourful citrus fruits, such as these grapefruit.



trees may have developed an immunity to the scale diseases, and that the *Juniperus bermudiana* may yet be saved from extinction.

Meanwhile, the work of clearing away the dead trees and replacing them by suitable trees and shrubs continues and is scheduled to be completed by 1960. Because of the strong winds that occasionally sweep the colony, it is essential to try to establish good wind-breaks with hardy plants. In this respect the whistling pine, introduced from Australia, has been found highly effective.

The reafforestation scheme is costing the Bermuda Government approximately £60,000 a year, but in the long run this may be recovered from a new industry that has grown up to utilize the dead cedar wood. After much experimentation it was found that the trees, even the thinnest branches, could be converted into compressed boards suitable for wall-panelling, doors, floors, and such pieces of furniture as coffee tables. The process consists of putting the wood through a machine that chews it into small chips which are bound together by plastic and formed into boards under pressure. When coated with filler and polished, the boards have excellent colouring and a pleasing design, and are strong and durable.

Other recent drastic changes include the leasing of almost three square miles of Bermuda to the United States armed forces for a period

of ninety-nine years, and the decision of the British Government in 1951 to close down the greater part of its vast naval base on Ireland Island. About 100 acres of docks, machine-shops, storehouses, administration buildings and barracks that were turned over to the Bermuda Government are now being offered as industrial sites by the Bermuda Crown Lands Corporation. The area has been declared a free port to encourage foreign concerns to establish themselves there. Already several international companies are operating small plants in the reconditioned buildings, preparing perfumes, concentrated essences and other products appropriate to Bermuda.

However, some of the facilities abandoned by the Royal Navy are suitable only for naval requirements, and Bermuda is hopeful that the Royal Canadian Navy may take them over. During the Second World War, when Canadian naval officers needed year-round warm water in order to maintain training schedules, a Canadian naval base was acquired on Ireland Island. This was abandoned promptly in 1945 and, although Canadian warships still operate regularly in Bermuda waters, there has been no recent indication that Canada intends to resume charge of shore installations there. The Royal Canadian Navy's former Flag Officer, Atlantic Command, Rear-Admiral R. E. S. Bidwell, declared frequently that Canada needed a naval base at Bermuda, but the only result was the appointment of a permanent liaison officer to look after Canadian naval requirements in Bermuda waters.

Two major problems as yet unsolved concern population and water. The 1950 census showed a total resident population of 37,556, of which 22,773 were coloured and 14,783 were white. In 1955, the official estimate was 42,000 people. This rate of increase was described by Park Breck of the Health Department's Population Committee as "pushing ourselves off our own rock."

The solution offered by the Population Committee is planned parenthood, with clinics and propaganda to reduce by one-half the more than 1,000 live births recorded annually. How-

The decorative wood of the "Bermuda cedars" destroyed by scale disease is being used in the construction of homes, furniture and ornaments.





The Bermuda scene. Houses are built from the native limestone. The whitewashed roofs serve as catchments for rainwater, the main source of Bermuda's supply of fresh water.

ever, many people, including all the church officials in the colony, say that this is going about things the wrong way, and a hot debate is now being waged.

Another solution appears to be offered in the work being done at the United States bases to increase the available land by filling in shallow shore areas and draining marshland. It is estimated that several thousand acres could be added to Bermuda by these methods, which would help alleviate for several years the present population congestion.

The 1955 estimate showed a population density of 2,365 a square mile, exclusive of base personnel, temporary visitors and tourists. In 1956, more than 100,000 tourists visited Bermuda. This number promises to swell rapidly as air travel comes within the reach of more and more people. Of the 1956 visitors, about six per cent were from Canada, but Trans-Canada Airlines is planning to increase its services to Bermuda when the new Vanguard aircraft go into service within the next year or two. Already most of the big international airlines have landing privileges at Bermuda, which makes the colony once again a centre of commerce, as it was in the days of sail.

This growing congestion, however, creates a major problem on islands which depend for fresh water on rain, especially when nearly all the visitors have been accustomed to wasting

water with a lavish hand. Bermuda's hospital and some hotels have sunk wells into the porous limestone; but the resulting water, while suitable for some purposes, is unfit for drinking. The larger hotels pump in salt water for toilet purposes, the proprietors resigning themselves to replacing plumbing equipment every three or four years.

The annual rainfall averages fifty-eight inches, and every effort is made to utilize every drop of it. Every house has its own storage tank, and the whitewashed roofs serve as catchments. When a householder's tank runs dry, he buys water from the government storage tanks, which are replenished by large reservoirs constructed on exposed hillsides. In recent years, the demand for water has forced Bermuda to import it by tanker from the United States — a practice which puts water in the classification of luxury items. Meanwhile, consideration is being given to the possibility of distilling fresh water from the ocean. This is already being done on a small scale at the United States Air Force base.

In spite of these problems, the general atmosphere of Bermuda is one of prosperity, determination and optimism. The spirit of Sir George Somers and his band of colonists is reaching down through three and a half centuries to help overcome all obstacles and solve all problems.



Some of the participants in the conference. In the front row Dr. Hans W. Ahlmann of Sweden, President of the International Geographical Union, is sixth from the right; Dr. L. Dudley Stamp of the United Kingdom, immediate Past-President, is sixth from the left.

International Geographical Union Regional Conference in Japan

by N. L. NICHOLSON

THE REGIONAL CONFERENCE which was held in Japan from 29th August to 3rd September 1957 was a milestone in the annals of international geography, for it was the first time that geographers from all parts of the world had met in that country or, indeed, in any part of the Far East. Organized by the International Geographical Union and the Science Council of Japan, it was attended by seventy-five foreign geographers, representing twenty different countries. Dr. N. L. Nicholson, Director of the Geographical Branch, Department of Mines and Technical Surveys was the only representative from Canada, although Dr. Gilles Lalonde, a member of the staff of the Canadian Embassy in Tokyo, registered for the conference and attended many of the meetings. The participants had the opportunity to take part in one of two excursions before the conference proper and one of three after the conference. Each of these field trips, led by at least one outstanding Japanese geographer, lasted from seven to ten days. Together they covered all the major regions of Japan. The guide-books produced for them form the most up-to-date source of geographical information on the country in English.

The first three days of the conference itself were held at the University of Tokyo. The

opening session included an address by the Minister of Education of Japan and a lecture by I.G.U. Past-President, Dr. Dudley Stamp of the United Kingdom, on "The Scope of Applied Geography". This was followed by technical sessions which included sections on geomorphology, multi-purpose projects, climatology and industrialization. There was also a session on land utilization which was opened by Dr. N. L. Nicholson, speaking on "Land Use Mapping in Canada". Throughout the three-day period a display of modern Japanese maps was on exhibition — a most impressive demonstration of all that had been done recently in this field. The first half of the conference concluded with a reception by the Minister of Education, held in the residence of the Prime Minister of Japan.

The technical sessions were supplemented by guided field trips within the Kwantō plain. This is the largest lowland in Japan and is occupied by almost one-quarter of the total population of the country. It is dominated by Tokyo, which with its population of 8,000,000 — more than that of the whole of the Provinces of Ontario, British Columbia and Alberta combined — is probably the largest city in the world. Its central business area is like that of any other large city in the New World, yet the presence

of the castle-like residence of the royal family with its surrounding moats and parkland is a reminder of the "old Japan" and the distinctive traditions and customs of the people.

On Sunday, 1st September, the whole conference moved by modern electric train to Kyoto and thence by bus to Nara. This, in itself, was a geographical experience, for the route was through the Sun-en district, the coastal corridor through which Japan's most famous and historic road, the Tokaido, connected Kyoto, the old capital, and Tokyo, in the days when it was known as Yedo.

The technical sessions then continued at Tenri University, Nara, on 2nd September, with sections on land utilization, which were chaired by Dr. Nicholson, geomorphology, settlement geography and population. The next day the sections on climatology, hydrology and regional geography completed their deliberations and the formal closing session took place, at which I.G.U. Past-President Dr. George Cressey of the United States spoke on the Middle East. In contrast to Tokyo, the locale of the second half of the conference was in an area rich in Japanese history, for Nara was the ancient capital of the country from A.D. 710 to 784. The whole city today is a "museum piece". In keeping with this, the geographers had arranged a very fine and unique exhibition of old historical maps of Japan for the visitors.

All of the arrangements were extremely well organized, but the success of the meetings also owed much to the hospitality of the Japanese and the social gatherings at which informal discussion was possible. Several receptions were given in honour of the foreign visitors, the hosts of which included the Association of Japanese Geographers and the Tokyo Geographical Society, the President of the Science Council of Japan and the Chairman of the Organizing Committee of the conference, the Governor of Tokyo, and the President of Kyoto University. One of the most memorable of these occasions was the *suki-yaki* party given by the President of Tenri University in the Great Hall at Tenri.

Japanese geographers are to be found in government, business, industry and teaching and have, for a number of years, carried out excellent research. Unfortunately, most of this is published in Japanese, one of the most difficult languages in the world to learn, so that little of it is known first-hand in Canada. The conference, therefore, afforded an excellent opportunity to correct this, as all the proceedings were conducted in English, including the papers presented by the Japanese. In addition, the foreign visitors were able to learn something of Japan and its charm, its people and their hopes and aspirations and their place in the south-east Asian region as well as the world as a whole.

A partial view of Tokyo, where the first part of the conference was held. Tokyo Bay can be seen in the distance, as well as the Sumida River, which runs through the city.





General A. G. L. McNaughton, Chairman, Canadian Section, International Joint Commission, acting as master of ceremonies, opens the dedication ceremonies of the Niagara Remedial Works Programme at Niagara Falls. Distinguished platform guests include both Americans and Canadians, most of them directly concerned with the programme.

Remedial Works Programme at Niagara Falls, 1957*

by SYLVIA SEELEY

Hydro-Electric Power Commission of Ontario photographs

ON 28TH SEPTEMBER 1957 a ceremony of far-reaching significance took place at Niagara Falls. That day marked the completion of the remedial works and conservation programme that had been jointly carried out by Canada and the United States in the Niagara River. The master of ceremonies on this epoch-making occasion was the Chairman of the Canadian Section of the International Joint Commission, General A. G. L. McNaughton, Vice-President of the Royal Canadian Geographical Society. A large gathering assembled on the Niagara Parkway at the site of the newly erected control structure, and amongst those present were representatives of the governments of Ontario and the State of New York; the municipal authorities of the twin cities of Niagara Falls; and representatives of the Hydro-Electric Power Commission of Ontario, the Niagara Frontier State Park

*See Canadian Geographical Journal, September, 1954

Commission and the Niagara Parks Commission of Ontario. All these had borne their part in working for a scheme that has been acclaimed as "conservation in its truest sense."

In the course of his opening remarks, General McNaughton said, "The question at issue has been to gain the benefit of power in abundance, here made possible by Divine Providence, and, at the same time, to preserve and enhance the beauty of the scenic display which people from all the world over journey to this place to see and enjoy. Strange as at first thought it may appear, the attainment of these seemingly diverse objectives has not proved to be impossible and it has been the satisfaction of the demand that the people be served by the provision of power which has opened the way to the attainment of the cultural and aesthetic objectives which we are to dedicate today.

"The study of the preservation of the Falls

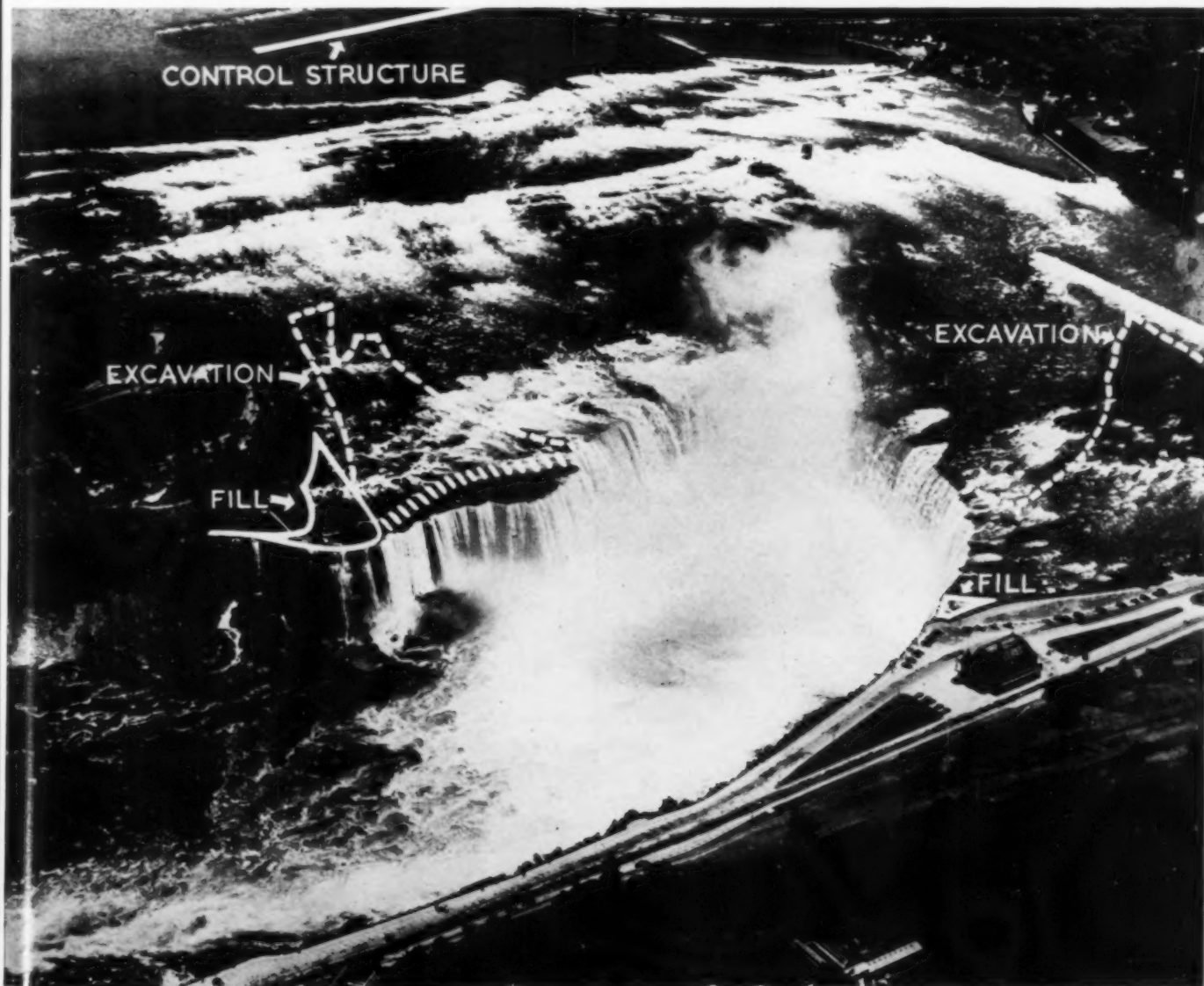
REMEDIAL WORKS PROGRAMME AT NIAGARA FALLS, 1957

has been an intricate task for many men for many years, and the first really authoritative report which seemed to point to practicable methods was that prepared by the special International Niagara Board in 1929, of which Dr. Charles Camsell of Ottawa and the late J. Horace McFarland of Harrisburg, Pennsylvania, were the chairmen. I might mention that we were most anxious that Dr. Camsell should be present at these ceremonies today in order that he might view himself the outcome of the proposals which he and his colleagues put forward, but unfortunately he had to decline our invitation because of reasons of health.

"It was agreed that the Hydro-Electric Power Commission of Ontario would undertake

the construction of the works for Canada and the Corps of Engineers of the United States Army would do the same on behalf of our neighbour. When the results of the precise surveys of the underwater topography along the crest of the Falls and upstream carried out at the instance of the engineering board committees became available, models of the river and Falls were built at Islington, Ontario, and Vicksburg, Mississippi, one to check against the other for greater certainty and to ensure that every plan with promise could be studied; and each aspect of the result verified and reverified to ensure that the distribution of water was best for the scenic spectacle, giving magnificent continuity along the crest—and in colour—and that there was assurance against

This picture, taken in 1954 before completion of the programme, shows the principal features of the project: excavation of channels on each flank of the Horseshoe Falls to draw water from the centre; crest fills to eliminate incidental flows from the extremities of the crests and permit an unbroken curtain of water to flow; and construction of a control dam to control the water level in the Chippawa-Grass Island Pool area.



the over-concentration of flow in notches with the consequent progressive erosion and acceleration of damage. In conformity with the traditional procedures of the International Joint Commission, as information developed and proposals for design evolved, the greatest care was taken to consult the agencies interested and to demonstrate to them, on the conveniently located Islington model, the scenic aspects of the results to be expected and to benefit by suggestions made".

At the conclusion of these opening remarks, General McNaughton called upon the Reverend H. C. Linstead, Chairman of the Greater Niagara Ministerial Association, to pronounce the dedicatory invocation, and after this, the Chairman called upon Mr. Douglas McKay to introduce the Honourable Wilber M. Brucker, Secretary of the United States Army, to give a dedicatory address. Mr. Brucker reminded his listeners that the first diversion of water from the Falls for power purposes was made as long ago as 1853 to supply mechanical drive for some American mills. In 1881 came the first

electric generators to light up the little village of Niagara Falls in New York State. Twelve years later the first Canadian plant was constructed to supply power for an electric railway connecting Lakes Erie and Ontario.

Today there is a total installed capacity amounting to 2,000,000 kilowatts. The New York Power Authority hopes soon to double this figure, but the obvious risk of withdrawing so much water has troubled those who realize that our scenic heritage must not be sacrificed to our industrial needs. Nor is man the only destructive agent; the volume of water was gradually cutting back the rocks over which it flows, and if this erosion is not checked it might eventually have a disastrous effect on the level of Lake Erie.

These and many other difficulties have now been jointly overcome by the best brains of our two countries, and the even curtain of water has been safeguarded. The cost of the whole project will be repaid by the greater power generated. The speaker concluded by saying, "The Niagara Falls remedial works which we are dedicating today constitute a monument to the vision and faith of many distinguished citizens of both our nations, and to the vigorous neighbourly spirit which has contributed so mightily to the strength of Canada and the United States alike."

After this address by the United States representative, General McNaughton then called upon his Canadian colleague, the Honourable Alvin Hamilton, Minister of Northern Affairs and National Resources, to give the Canadian dedicatory address. Mr. Hamilton said that he felt a new sense of responsibility with respect to matters which, in the setting of Niagara Falls, reached the zenith of perfection. He emphasized the care and skill that had been taken to develop the beauty of the park land surrounding the natural glories of Niagara, and the new vantage points which had so much value in encouraging the tourist trade to this wonderful site. He referred to that branch of his ministry which is concerned with parks, water resources, forests and tourists, and commended the members of the Ontario Niagara Park Commission and the Niagara Frontier State Park Commission for





Shown here is the Grass Island Pool control structure, which extends 1,550 feet from the Canadian side of the river, about a mile above the Falls. Each of its thirteen hydraulically-operated gates is 100 feet wide and weighs about 150 tons. The purpose of the structure is to control the water level in the Chippawa-Grass Island Pool area.

having made the utmost of their unique opportunities. He spoke also of the exceptional difficulties of investigation under the hydraulic conditions found in fast-flowing waters, and of the co-operation of the park authorities on both sides of the Niagara River, an example of the high order of achievement in international relations.

The urgency of these remedial works becomes startlingly evident when one learns that the Falls have been estimated as about 25,000 years old and that in post-glacial times the site of the Falls was seven miles farther north, where Lewiston, New York now stands. Since 1764 the Falls have been receding at an average rate of four feet a year, due to the crumbling of the Niagara limestone, which rests on soft layers of shale and sandstone. Owing to their greater volume of water, the Falls on the Canadian side are being pushed back much faster than those

on the American side, and the International Joint Commission studied this problem of erosion with careful consideration both for the scenic and power requirements.

A particularly important feature of the project was the control of the water level in the Chippawa-Grass Island Pool area, because it is the site of intake works both for the Canadian and United States power plants. To achieve this control the Ontario Hydro-Electric Power Commission erected a graceful-looking structure about one mile above the Falls and 1,550 feet from the Canadian side of the Niagara River, equipped with thirteen sluices, each with a control gate a hundred feet wide and weighing about 150 tons; they are raised and lowered by means of a hydraulic system worked from the shore end of the dam.

Actual construction of the control structure, carried out by the Ontario Hydro-Electric

Commission, involved some interesting engineering techniques. The task was completed in six stages by means of a series of temporary coffer-dams made up of six-ton pre-cast concrete blocks, steel cribs and interlocking steel sheet piling. Each section of the river enclosed by a coffer-dam was pumped dry and, as work neared completion on the permanent structure in the de-watered area, the next coffer-dam stage was commenced. Thus the structure progressed out into the river by means of a sort of leap-frog operation with the second stage coffer-dam materials being used in the fourth stage, and so on until the bridge or roadway was built from pier to pier to provide access during construction and for permanent access upon completion.

In order to produce an unbroken crestline and achieve the desired even distribution of flow over the Horseshoe Falls, two areas were excavated. On the Canadian flank of these falls approximately 75,000 cubic yards of rock in the channel were excavated, while work on the second area, on the Goat Island flank, involved the removal of 30,000 cubic yards of rock. Appropriate construction and landscaping have

provided attractive vantage points from which visitors can view the majesty of the cataract.

It was estimated that the cost of the remedial works would be approximately \$17,500,000, and the fact that it has been completed for some \$5,000,000 less reflects credit on the ingenuity and co-operation of the engineers on both sides of the Niagara River. The many and far-reaching benefits which will be derived by both Canada and the United States as a result of this all-important conservation work are likely to become increasingly significant with the passing of years. The tremendous year-round influx of visitors to this area is an important factor in relation to the national economies of the two countries.

At the conclusion of the speeches the Chairman called upon Mr. Hamilton for Canada and Mr. Brucker for the United States to take up their positions and jointly to operate the controls of the remedial works.

The impressive ceremony closed with the Chairman calling upon the Right Reverend Monsignor J. Tronolone, Pastor of St. Joseph's Church, Niagara Falls, to pronounce the benediction.

Participants in the dedication ceremonies shown here are: (left to right) J. S. Duncan, Ontario Hydro Chairman; Honourable W. M. Brucker, Secretary, United States Army; Honourable A. Hamilton, Minister of Northern Affairs and National Resources, Canada; General A. G. L. McNaughton, Chairman, Canadian Section of the Commission; G. Spence and J. L. Dansereau, members of the Canadian Section; Douglas McKay, Chairman, United States Section; R. B. McWhorter and E. W. Weber, members of the United States Section.



OBITUARY

A. G. Mordy

It is with the greatest regret that we have to record the death of Mr. A. G. Mordy who for the past two and a half years had filled the office of Honorary Treasurer to the Royal Canadian Geographical Society. He was active on the Society's behalf up to a day or two before his death, and his valuable services and kindly manner will be seriously missed.

Mr. Mordy was the eldest son of Mr. and Mrs. James Mordy of Almonte. He decided early to make banking his career, and was serving as an accountant in the Winnipeg branch of the Canadian Bank of Commerce when the first World War broke out and he enlisted at once in the Queen's Own Cameron Highlanders of Canada. He served in France throughout the war with the Canadian Scottish, and was twice seriously wounded. He was awarded the Distinguished Service Order, was twice mentioned in despatches and attained the rank of Major.

After the war he rejoined the Canadian Bank of Commerce in 1919 as an inspector in the head office and was later appointed manager successively at Kingston, Chatham, and at Ottawa where he worked till his retirement in 1948. He was connected with many clubs and charitable institutions and was chairman of the Temporal Committee of St. Andrew's Church. He was an elder of the Kirk Session and chairman of the Glebe trustees.

He is survived by his wife and two sons to whom the Royal Canadian Geographical Society tenders its deepest sympathy.

* * *

EDITOR'S NOTE-BOOK

Dr. Edmund Carpenter (*Serpent on the Hill: the Story of a Sacred Grove*) is professor in the Department of Anthropology at the University of Toronto. His article is believed to be the first to attempt to synthesize Canadian prehistory and present it

to the layman. Dr. Carpenter spent part of last summer engaged in special work in the interior of Borneo.

* * *

Richard Harrington (*British Columbia Beef Drive*), the noted photographer, has presented many fine studies of the Canadian scene in this magazine and others. Long hours on horseback in the interior of British Columbia led to this penetrating portrait of a rancher and his family on their annual 200-mile trek to Quesnel to market their cattle.

* * *

Marcus Van Steen (*Bermuda Copes With Major Problems*) for the past two years has been a freelance writer, contributing to magazines, newspapers, and radio and television stations, mostly in Canada. He was formerly editor in charge of the Maritime newsroom of the Canadian Broadcasting Corporation at Halifax.

* * *

Dr. N. L. Nicholson (*International Geographical Union Regional Conference in Japan*) is Director of the Geographical Branch, Department of Mines and Technical Surveys, Ottawa. Prior to receiving this appointment, he was engaged in special geographical research for the Canadian Government, and earlier he was a lecturer in geography at the University of Western Ontario, London.

* * *

Sylvia Seeley (*Remedial Works Programme at Niagara Falls, 1957*) has an interesting background of experience, which includes writing magazine articles, translating from several foreign languages, teaching, and archaeological research. Miss Seeley is a member of our editorial staff and also is the Society's librarian.

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Before you invest, investigation is good common sense. After you invest, investigation is also good common sense. "See your dentist twice a year" is not propaganda . . . it is preventive dentistry. Most people think it good business to check trouble before it starts or, at least, before it becomes serious.

To have your investment adviser check your securities at regular intervals makes sense too. Conditions change, industries change, markets change. To "put them away and forget them" is not good . . . it's not good for teeth, and it's not good for securities.

Our organization is equipped to help you investigate *before* you invest and . . . *after* you invest, to help you by regularly checking your securities to see that your funds are working to best advantage and to see that they are doing for you what you want done. Any of our offices or representatives will help you . . . drop in or write, whichever is more convenient.

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THE TRAVEL CORNER



The dog derby is an important feature of the Northern Manitoba Trappers' Festival at The Pas. An Indian boy with the lead dog of his father's team.

Manitoba Travel & Publicity Bureau

Northern Manitoba Trappers' Festival

One of the more interesting Canadian winter festivals is that at The Pas in Manitoba, which is designed to focus attention on the northern part of the province and its resources. Known as the Northern Manitoba Trappers' Festival, it is being held this year 26-28 February for the eleventh time.

Instead of borrowing or imitating what has proved effective elsewhere, this festival derives its colour from the past of its own region. A visitor may find himself taking a dog-team taxi, wearing a foxtail hat, dining on beaver-tail soup and caribou tongues, and perhaps even singing "When the Ice-Worms Nest Again", a song introduced during the 1949 festival.

The local population participate enthusiastically in the festival. It is particularly interesting to see the Indians performing reels and square dances adapted by their ancestors from the dances of early Scottish settlers. At the trading post their beadwork, leatherwork and silkwork is offered for sale.

The main event is the dog derby, which is run over a course about 140 miles long. This race was first held in March of 1915. It was repeated at intervals till the early 1930s, then was

allowed to lapse till 1948 when it was revived. Another highlight of the festival is the Fur Queen's ball. There are also ice-fishing contests, snowshoe marathons, dog-handling displays, stage shows, and displays of special skills such as trap-setting and rat-skinning. The program is not without its touch of whimsy. Each year there is a competition for the invention of a strange new northern animal — a contest in which clever taxidermists are apt to carry off the honours with such fantastic creations as the "snow snake" (a snake with a coat of fur).

Further information about the festival may be obtained from the Travel and Publicity Bureau, Department of Industry and Commerce, Winnipeg.

World Skiing Championships in Austria

The World Skiing Championships will be held at Bad Gastein, Austria, 2-9 February. The competition is sponsored by the International Ski Federation and the best skiers from thirty countries are to take part in the competitions. The greatest care has been taken to prepare tracks that are both challenging and safe for participants. Spectators will find that the entire Bad Gastein Valley, with its large hotels in a succession of tiers, is like a huge natural stadium, affording excellent views of the tracks from many directions. Events planned for the competition are as follows:

- 2 February - special slalom for men
- 3 February - special slalom for women
- 5 February - giant slalom for men
- 6 February - women's downhill race
- 8 February - giant slalom for women
- 9 February - men's downhill race; final celebrations.

Quebec City's Winter Carnival

The fourth annual Quebec Winter Carnival commences in Quebec City 1st February and continues till Mardi Gras, 18 February. Special events have been planned for almost every day of the period. These include the international dog sled derby, horse-drawn cutter races, ski championships, bobsleigh races, an ice-canoe race and the crowning of a carnival queen.

Schwarzer Bock Hotel Reopened in Wiesbaden

In Wiesbaden, the famous German spa, the Schwarzer Bock Hotel has been renovated and reopened after a long period of disuse. It now has 150 single rooms and eighty-five double rooms, most of them with private bathrooms. About eighty per cent of the rooms are furnished with period furniture. There are also some with Chinese and Japanese décor. The hotel has a very fine collection of Persian carpets — some of which are used as tapestries. Thermal water is supplied directly to the building for various medicinal baths and therapeutic services are provided.

1958 Plans for Stratford, Ontario

It has been announced that the 1958 Stratford Shakespearean Festival at Stratford, Ontario will run for twelve weeks, from 23 June to 13 September. Three Shakespearean plays will be presented: *Much Ado About Nothing*, *The Winter's Tale*, and *Henry IV*, Part One. The Glasgow-born actress, Eileen Herlie, will appear with the festival company. Others taking leading roles will be Christopher Plummer, Frances Hayland and Douglas Campbell.

Bermuda Guest Houses

Many of those who visit Bermuda prefer to stay at a guest house instead of a hotel. There are more than forty from which to choose, each housing from perhaps twenty to fifty or so guests. Most were once private residences, and the better ones combine the hospitality and individual attention of a home with the luxury of a country estate. An example is the Fourways Inn on Middle Road in Paget Parish, which is 250 years old and has a markedly old English atmosphere. There is accommodation for thirty. Another, in the Saltkettle sector of Paget, is Glencoe, which dates back to the early eighteenth century. On Hamilton harbour there is Waterloo House, an early nineteenth century building with space for fifty-five guests. In Paget, again there is Pomander Gate, surrounded by eight acres of gardens and lawns with a comfortable main house furnished with antiques, and also a group of attractive cottages. Thirty guests may stay here. In Smith's Parish in a lovely estate setting on a high hill with a splendid view of Harrington Sound stands luxurious and exquisitely decorated Deepdene Manor. These are only a few of the guest houses from which the traveller may choose. Most travel agents can furnish details about them and others.

AMONGST THE NEW BOOKS

Jurassic Geology of the World by W. J. Arkell

Hafner Publishing Company, New York. \$16.50)

This book is a synthesis of the Jurassic system in all parts of the world, based on a substantial, critically scrutinized literature and the authors own well-known studies in various continents and of numerous fossil-collections. Age and correlation of the Jurassic rocks, and the dating of important events is, of course, based on ammonites, the most reliable guide-fossils of the Jurassic.

The greater part of the book deals with the stratigraphy, age, and correlation of the Jurassic in all continents and represents a most welcome reference work of highest standard. Based on these facts well-founded and cautious conclusions on such questions as permanency of the oceans, faunal realms, volcanic activity and diastrophism are made. As the chapters concerned are naturally of more general interest, this review will be mainly concerned with them.

In a very clear and concise introductory statement on "Classification and correlation" the author changes the position of the Callovian stage, which on this continent and in many

other countries is commonly regarded as the lowermost stage of the Upper Jurassic, to the upper Middle Jurassic where it had originally been placed by von Buch. This procedure may cause some confusion and will probably not be generally acceptable. The author expresses justifiable dissatisfaction with palaeogeographic maps because they have to be often altered with increasing knowledge and change of opinions. A widely accepted palaeogeographical map of the Oxfordian in North America which the author re-figures without comment is a typical example. This map shows the presence of a narrow land which extended from the American boundary northward for about 600 miles into Western Canada. This land cannot be substantiated by facts. Recent work by the Geological Survey of Canada has shown the presence of four thousand feet of marine Jurassic sediments in the southern part of this so-called "land". On the other hand there is no justification for a seaway through the Mackenzie River region connecting the Arctic ocean with the West Canadian Jurassic sea. Current work by the Geological Survey of Canada in the Canadian Arctic has shown the presence of marine Jurassic rocks and faunas on some of the islands which

(Continued on page VI)



THE ROYAL CANADIAN GEOGRAPHICAL SOCIETY

TWENTY-NINTH ANNUAL MEETING

To conform with By-Laws of the Society, the Annual General Meeting of the Society is called for Thursday, 20 February 1958, at 12.00 noon, in the Board Room of the Department of Public Works, 853 Hunter Building, Ottawa. The Board of Directors hereby serve notice that immediately after the meeting is convened a motion will be made that the meeting be adjourned to the evening of 13 March 1958, at 8.30 p.m. in the Lecture Hall of the National Museum of Canada, Ottawa, in order that members may have the privilege of hearing an address by Dr. J. T. Wilson, O.B.E., Professor of Geophysics, University of Toronto. A further notice will be published in the February issue.

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(Continued from page V)

were formerly considered as beyond the reach of Jurassic transgression, necessitating still further adjustment of the palaeogeographic map.

The author's general conclusions are of particular interest to the geographer. Faunal evidence is in his opinion against the drifting apart of the New and Old Worlds since the Jurassic, and he shares the view of others who favour permanency of most oceans. Thus the North Pacific, Arctic, Scandic and North Atlantic were already present during the Jurassic; a land-bridge, however, from the British Isles over Iceland and South Greenland to Nova Scotia was probably present. Little is known of the South Atlantic region in Jurassic time. If, however, Kober's idea of an orogenic belt in the region of the Mid-Atlantic ridge is valid, a geosyncline would have to have preceded it in this region, formerly considered as the western part of the hypothetical Gondwana land. A land barrier joining Madagascar to Ceylon and peninsular India and separating two southward extensions of the Tethys from one another appears likely during the Jurassic. According to the author the number of faunal realms can be reduced to three — the Tethyan, Pacific, and Boreal. None of these realms was developed in the Early Jurassic, when the ammonite faunas were almost ubiquitous. Faunal differentiation of the three realms is first indicated in the Middle Jurassic and becomes particularly evident in the latest Jurassic, when the Tethyan realm developed faunas entirely different from those of the boreal Volgian and Portlandian. At various times merging of one fauna with another took place. Thus the Upper Oxfordian of Mexico in the Pacific realm shows strong faunal influence from the Tethys.

Faunal and lithological evidence lead to the conclusion that the Arctic Ocean had no ice cap, that its water temperature was at least equal to that of the present temperate zones but cooler than the sea farther south. The author considers Dubois' theory of increased solar radiation rather than a migration of the poles as the most probable explanation of the warm temperature of the Jurassic.

Shields, shelves, mobile belts and geosynclines of the Jurassic are clearly analyzed and discussed and special attention is given to volcanic activity and diastrophism. Many occurrences of volcanic rocks are not accurately dated due to the rarity of determinable fossils in adjacent sedimentary rocks. As the author particularly mentions Harrison Lake area B.C., the re-

cent discovery of a new Lower Jurassic fauna in sediments intercalated with the volcanic rocks may be mentioned which will provide a further step towards accuracy of the dating of the volcanic events. The Jurassic diastrophism reached its greatest intensity in the Western Cordillera of North America, particularly during the late Jurassic, when the Nevadan orogeny connected with great batholith intrusions took place. The Agassiz orogeny — named after the town of Agassiz, British Columbia — is over-emphasized. The exact age of the Kent conglomerate regarded as the main witness of this orogeny is unknown, though an Oxfordian age is possible, and it has not been proved yet that the underlying Jurassic rocks which include Callovian were folded before deposition of the conglomerate. According to recent unpublished investigations the Kent conglomerate seems to rest on the Callovian without any angular unconformity.

It would be deplorable if geological science had nothing more to contribute in the future to the author's fully up-to-date picture of the Jurassic system. More facts may come to light and opinions may be changed. Whatever these changes may be, this book will stand as a monument created by a master of his craft, as a source of knowledge and as an inspiration to all those concerned with the geological history of the world.

The book is well documented with many plates, figures and maps. Much of its success is due to the author's fine style of writing which makes it a very readable book.

HANS FREBOLD

Dr. Hans Frebold is head of the Section of Stratigraphic Palaeontology in the Geological Survey of Canada at Ottawa.

* * *

Southern Africa

Volume I Physical Geography
Volume II Economic & Human Geography

by John H. Wellington

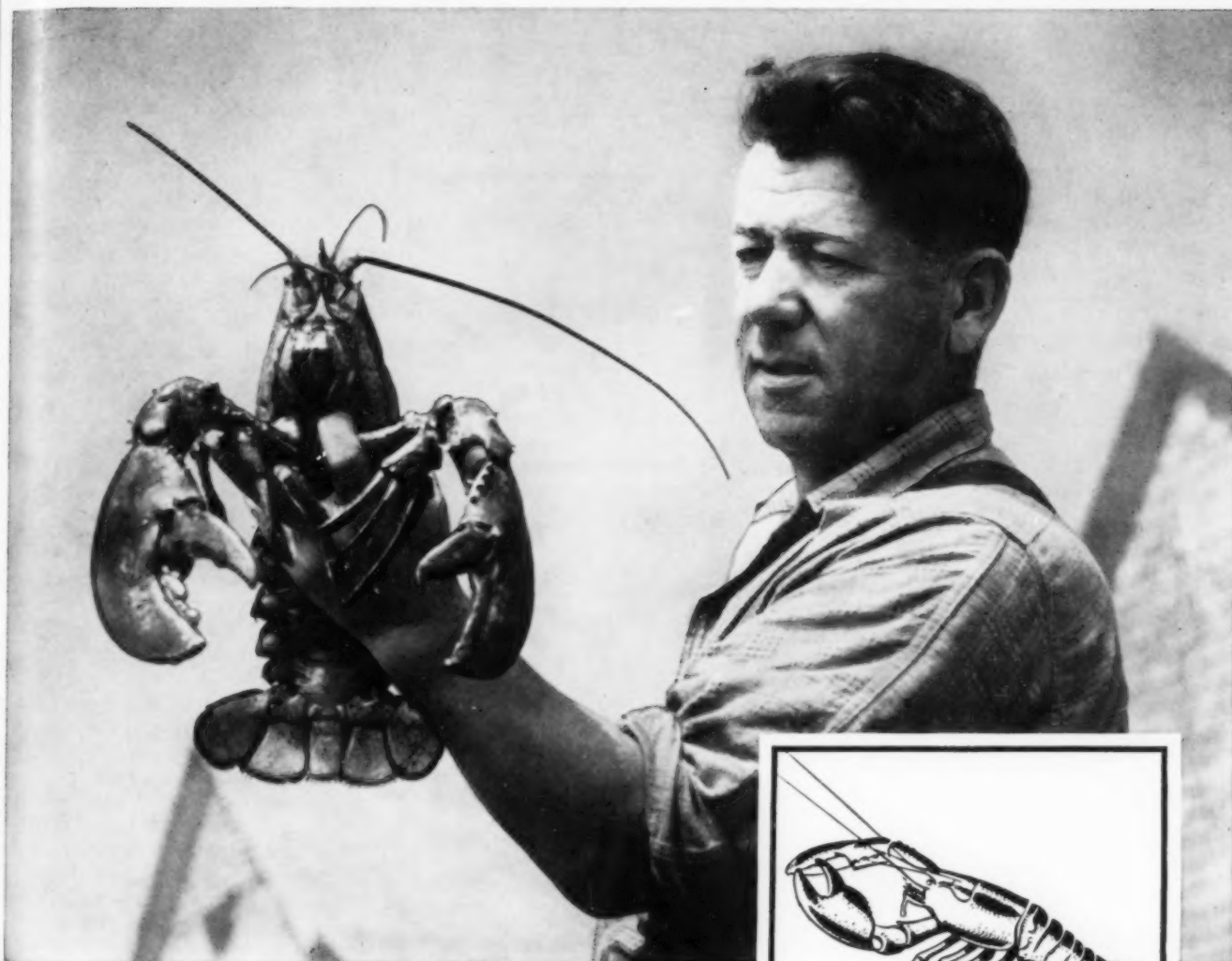
(Macmillan Company of Canada, Toronto. Vol I \$12.00. Vol. II \$6.00)

"Geographers, in Africa maps, With savage pictures fill their gaps. And o'er the inhabitable downs, Place elephants for want of towns."

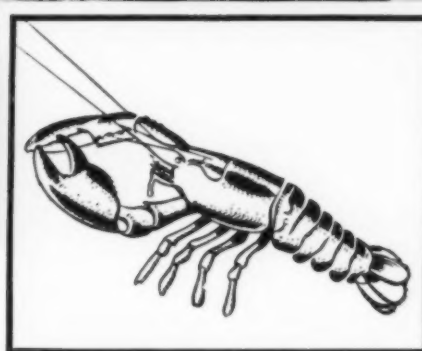
— Swift.

For centuries the mysteries of the African continent have fascinated explorers and travellers. Their accounts have been recorded by cartographers and geographers through the ages, sometimes faithfully, sometimes fancifully. One of the first accounts of the topography of Africa was given as early as the beginning of the sixteenth century.

(Continued on page VIII)



A year ago, the life of this fine lobster was reprieved. Then small, he was thrown back into the sea—allowed to grow into a bigger, more profitable catch. By throwing back shorts, lobster fishermen are actively cooperating with the Department of Fisheries to conserve their own great industry.



The one that got away!

MANY LOBSTERS CAUGHT in the Atlantic fishing grounds go back into the sea. Some are small and are reprieved to grow in size and quality. Some are berried—egg-carrying lobsters—willingly surrendered to go back and multiply. During close seasons, no traps are laid. This keeps their numbers at a safe level to ensure good catches in future years.

By following these vital conservation methods, the lobster fishing community wholeheartedly cooperates with the Department of Fisheries and safeguards the prosperity of its industry and livelihood.

The annual market value of Canadian lobsters has been estimated at 15 million dollars. The Department of Fisheries and the lobster fishing industry are jointly concerned to preserve this important national asset.



Atlantic lobster fishermen use these specially constructed traps—built to allow undersized lobsters to escape. This is only one of the conservation methods by which the industry is safeguarded.



2F-47

DEPARTMENT OF FISHERIES

OTTAWA CANADA

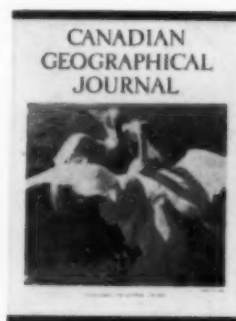
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W. H. CORKILL

THE MEAD, WEST DUMPTON LANE • RAMSGATE, ENGLAND

(Continued from page VI)

teenth century in Arabic by Leo Africanus in his *De Totius Africa Descriptione*. This intrepid traveller of Spanish-Moorish descent was followed by a succession of others down the years. Even so, Africa, this oldest of the continents, is still comparatively unknown, for it is a strange continent which guards its mysteries jealously; where the struggle for supremacy between man and nature is so fierce that often there are few traces left for the historians. Even today there are only a handful of men who have expert knowledge of Africa. For the rest it is still the "dark" continent.

In recent years there has been a spurt of renewed interest in Africa, and, in particular, focus has centred on Southern Africa. This interest stems partly from the rich stores and economic potential of the area, partly from its strategic importance in a contracting world, but mainly this renewed interest derives from the complexities of the racial and human problems of Southern Africa. This has brought about an extraordinary demand for information on that part of the world, and there is always ready sale for almost any new book which purports to deal with it and its problems. Unfortunately this demand has all too often been met during the last decade by journalistic essays whose authors either lacked local knowledge or scientific objectivity. The world has, therefore, had to rely very largely on the inexperienced writer who invariably proved unequal to the size of the task or the subject.

To fill this gap Professor Wellington has now provided us with two volumes devoted to a study of the physical, economic and human geography of Southern Africa. Professor Wellington is professor of geography at the University of the Witwatersrand. He is an eminent scholar with first-hand and intimate knowledge of his subject, and the value of his present contribution can hardly be exaggerated. It contains a fund of information, scientific and factual, which no one can afford to neglect if he wishes to gain an understanding of the complexities of Southern Africa — especially those who do not have the benefit of local knowledge.

The region which is covered by these two volumes is the whole physical division of Africa to the south of the Congo-Zambesi watershed, including the political units of the Union of South Africa, with South West Africa, the High Commission Territories of Basutoland, Bechuanaland and Swaziland, Southern and Northern Rhodesia (except for the

northern province), Nyasaland, Mozambique and Southern Angola. He deals in detail with every aspect of this large area which could interest the geographer, and there is little doubt that it will be a standard work of reference for economists and students of social sciences as well.

Volume I has three parts — *Physical Geography* in which is outlined the geological formations and surfaces, the main physiographic regions, the seas and the coasts; *Climate, Vegetation and Soils* which deals with the atmospheric pressure, winds, temperature, insulation, rainfall and types of vegetation and soils; *Hydrography* which treats the river systems, lakes and underground water.

The physiographic portion, which comprises almost half of this volume, gives an excellent account of the physical features of the region. Throughout this volume there are excellent photographs which illustrate and aid in the appreciation of the subject matter. There are also many tables and figures in the text and four folding maps in colour in a pocket at the end of the volume.

Volume II also has three parts — *Land Utilization* which deals with the main crops, animal husbandry, forestry, soil conservation and land classification; *Mineral and Other Industries* which relates to gold, diamonds, base minerals, manufacturing industries and fishing; and *The People* which gives an historic account of the growth of the European population, and sections on the Asiatic and Negro population and on the Bantu before and after Union. This volume is also illustrated with fourteen photographs and twenty-six figures in the text and four large folding maps in a pocket at the end of the volume.

It is not possible to do justice in a short review to what the publishers rightly claim to be a monumental study. The first volume, dealing as it does with matter which can be scientifically determined, can be assumed to be as factually accurate as is possible in a work of this nature. The second volume, however, deals with people and with history. These subjects allow the intrusion of interpretations and comments by the author. It is, therefore, worth noting the following remark which appeared in the *South African Journal of Science* in a note dealing with this study:

"Volume 2 is mainly factual, but is coloured to some extent by the opinions of the author, which are expressed directly and indirectly in comments upon the facts. No distortion of the facts occurs, but it may be mentioned here that opinions and views other than those of the author exist, especially where issues of colour

are involved. This is not a serious criticism, for the opinions expressed are met with widespread (but not universal) approval and may stimulate productive thought in various quarters. There is little risk that false impressions concerning the complex human problems of that region will be conveyed to those not personally familiar with Southern Africa, especially if they possess the background of fact which the author himself provides."

This view we endorse, and we only mention it because the study as a whole is of such high quality.

The author provides frequent footnotes which contain his bibliographic references. There is, however, no consolidated bibliographic reference, and this is an omission which must be regretted in an otherwise well-designed study.

This is an invaluable tool for the serious student of Southern Africa who wishes to inform himself in sincerity on his subject.

J.S.F.B.

* * *

Prosperity Beyond Tomorrow by Samuel H. Ordway, Jr.

(Ronald Press, New York. \$3.00)

This is a "message" book which points out the overwhelming im-

portance of taking effective steps to conserve natural resources if civilization as we know it is not to disappear. Essentially, the message is a bringing up to date of Malthusianism and states that our world must: (1) reduce the rate of population increase, (2) reduce the unnecessary consumption of raw materials, and (3) increase the productivity of natural resources. The author nowhere explicitly shows that the attainment of these objectives would substantially involve turning our modern economy on its head, as well as reversing the traditional incentives of profit-making and the continual striving to increase the income of those who contribute to production. Mr. Ordway does point out, however, that we must reduce our numbers or lower our living standards.

To make the implications of reducing levels of living more palatable the author suggests that a "new age of leisure" will allow society to adjust itself to lower levels of material living. He further insists that we must evolve a national will to limit the exploitation of natural resources and must turn our leisure-time activities towards new and more constructive ends. In fact, there is some hint that

(Continued on page X)

THE LAND of CANADA



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(Continued from page IX)

the "do-it-yourself" addicts may be the saviours of the world.

The educational system, too, is regarded as a basic element in the process of making us much more aware of the importance of conservation and of the constructive use of leisure. Ordway indulges in value judgments about the desirability of various kinds of recreational activities in terms of whether or not they make a positive contribution to the conservation of resources. It will seem curious indeed to the readers of the *Journal* that Ordway does not believe in travel as a desirable form of recreation. It is argued that our social patterns must undergo a radical change and increasing leisure is portrayed as the major factor that will bring about these desired changes. The patterns that must be reversed are the upsurge in human numbers, the wasteful and excessive use of natural resources and government policies toward resource use.

The author paints what, to this reviewer, is a fantastic picture of a society of the future that will result from increased leisure and an overwhelming public concern with the conservation of natural resources. Slum dwellers with more leisure on their hands will make old materials "into new designs remotely resembling those at the Museum of Modern Art and new drapes will appear . . . copies of Manet, Picasso and Dali will be pasted on the back of old sepias of the *Temptation of St. Anthony* and turned around in newly made frames . . ." The middle income groups will search for a place in the country: "It need be only a quarter of an acre, near the bus line but not part of a suburban development. The first step may be a platform, then tents and cots for the family. Next, stones for an outdoor fireplace — and personal adventure begins." The rich will engage in more constructive activities in their country places: "Bees may be installed in hives constructed at home . . . there can be honey in our leisure. Daughter wants a herb garden . . . and Mother some day is going to breed chows, when she gets time — God bless her."

Mr. Ordway's book unfortunately is the kind that is likely to convince only those dedicated few who have already been initiated into the entirely worthy cause of conservation. It offers no statistical or other verification of the major point that our world is using up its natural resources at a more rapid rate than it is replacing them. If this case could be convincingly made, it would undoubtedly influence a far greater proportion of our society's thoughtful

leaders to take the cause of conservation more seriously than at present.

W. R. DYMOND

Dr. W. R. Dymond is chief of the Manpower Analysis Division in the Department of Labour.

* * *

Yanamale, Village of the Amazon *by Dominique Darbois*

(Wm. Collins Sons and Company,
Canada Limited, Don Mills, Ontario.
\$5.00)

The photography in this book is even more impressive than the text, and that is saying a great deal. The illustrations show scenes and personalities in Yanamale, the remote village in southern French Guiana where some three hundred and fifty Oyanan Indians live, the last survivors of the Carib race from which they have sprung.

Mademoiselle Darbois with two companions spent several "moons" (months) in Yanamale, so named after its chieftain. Her purpose was to learn all she could of the life of these interesting natives, to take photographs and make films and recordings. Every facility was given her to accomplish this purpose. There is nothing in the Indians' life to hide. There is not even any privacy. Their huts are built without partitions or screens, without furnishings except hammocks and a small wooden bench. The cone-shaped roof also forms the walls which do not extend to the ground, thus enabling the observer to lie in a hammock and miss nothing of what goes on in the village. The natives wear only a loin cloth and a rich covering of paint upon which strange designs are drawn. Beauty care is a serious part of their routine, undertaken by both men and women.

Food consists largely of fish, shot with bow and arrow or taken with a hook, and whatever the hunters bring in from the forest. Macaws are popular and monkey's flesh is highly favoured — and flavoured; with red pepper. All Otana food is hot. As for drink, women chew cassava, made into a sort of bread from manioc, into a pulp, spit it into bowls of manioc juice, allow it to ferment and serve it under the name *kichiri*. Mademoiselle Darbois drank a quantity of this "sour buttermilk-tasting" beverage without too much revulsion, but she could not stomach the hand of a black monkey drawn from the cooking pot by the chief and presented to her as a great delicacy. Serious hunting is done with the aid of wild dogs trained for their task. They are taken from their mothers as

puppies and suckled by women of the village. Children are forbidden certain dishes not because of risk to health but because of some tribal taboo. Only after five cruel initiations, can a youth feel himself free to hunt, fish and eat as he pleases.

The initiation he suffers at ten includes the offering of his young body to hundreds of ferocious reptiles, after which he must starve for several days. Yet, the Oyanan Indians are not cruel. They are the kindest of people. Throughout Mademoiselle Darbois' stay, she never saw a child beaten or even scolded, or hurt on any kind of way. She did not hear one cry. One closes the book feeling a deep sympathy for this disappearing race, ignorant of the world beyond their borders and content that this is so. They are not hostile to civilized man, as their spirit of hospitality shows, but the complexities with which he surrounds himself bewilder them.

Simplicity, material and spiritual, is the key note of the Oyanan Indians.

MADGE MACBETH

Mrs. Madge Macbeth, in addition to writing several hundred feature articles and book reviews, has produced seventeen books. Travelling, she says, has become hard work but increasing her knowledge of foreign lands is pure pleasure.

* * *

Interval in Indo-China

by Andrew Graham

(Macmillan and Company, Toronto.
\$2.50)

To paraphrase the perceptive foreword written by Sir Hubert Graves for this new book on Indo-China, "Few people in Canada know much about Indo-China, a territory which has been, for many generations, an important sphere of French influence."

Our knowledge has developed considerably since 1954, however, mainly as a result of Canada's participation in each of the three International Supervisory Commissions for the three Indo-China states of Vietnam, Laos, and Cambodia. This growing awareness of the peoples and problems of these countries at the other side of the globe is not confined to the East Block of the Parliament Buildings or to those whose work or faith has carried them over the years to Indo-China. It is based most recently on the daily experiences of some 500 Canadians who have served, or are serving, a tour of duty in team-sites from Cao Bang in northern Tonkin to Cap St. Jacques on the coast of the China Sea, and from the jungles of

of the northern Laos to the broad plains of Cambodia.

Like the author of this new book, Colonel Andrew Graham of the Welsh Guards, most of them are from the military services. A difference is that as the author himself writes "my own last memory dates from the day on which the agreements giving Hanoi to the other side were being initialled in Geneva"; while our Canadian observers, from the military and foreign services, followed on as part of the complex international system of supervision and control set up in the aftermath of war under the Geneva agreements. But while the watershed of Geneva has brought many significant and sombre changes in the political patterns of this area, the peoples and scenes described by the author have a familiarity and an interest which reflect the age-old traditions and varied cultures of this fascinating and important part of the world, located at the cross-roads between free and Communist Asia.

For it is not of war or politics that the author writes (as a serving Military Attaché he could not), but of his personal impressions — his "scrapbook" — of the streets and sounds of Saigon, a visit to the high country of Dalat, excursions to the former Imperial Palace at Hué, the *Fête des Eaux* in Phnom Penh, a New Year's eve at Luang Prabang, and the mysterious magnificence of Angkor Wat. Canadians who served north of the seventeenth parallel will identify the ageless picture of the Tonkin peasant up to his hips in the muddy rice fields, and the "continuous frieze" of Tonkinese peasants loping past the rear window as one crosses the Doumer bridge across the vastness of the Red River.

This is a book which all who have visited or worked in Indo-China will wish to read, and which invites each of us to inform ourselves more fully of what is going on in this vital corner of Southeast Asia. For the author has brought to his subject keen powers of observation, sensitivity, and that saving grace for all who travel in far places, a sense of humour. It is to be hoped that it may even stimulate Canadians who have followed in his footsteps to report on their own "interval in Indo-China." S. F. RAE

Mr. S. F. Rae is Minister at the Canadian Embassy at Washington, D.C. Formerly he was adviser to the Canadian Commissioners, International Supervisory Commission in Indo-China.

* * *

Logging with Paul Bunyan

by John D. Robins

(The Ryerson Press, Toronto. \$3.00)
This addition to the already exten-

sive bibliography on that legendary lumberjack, Paul Bunyan, really needs to be read aloud. This is not surprising in view of the late author's talent for story telling, and actually much of it was told over the air in April 1951, on the Trans-Canada network of the Canadian Broadcasting Corporation.

Folklore grows in mysterious ways. The origin of the Bunyan stories is but eighty years back and they first reached print less than fifty years ago. I can remember hearing some of Paul's exploits talked about in lumber camps in northern Manitoba and Saskatchewan in the 1920s. The lumber industry there was closely associated with that south of the line and these stories had an undoubted Minnesota-Michigan flavour. The present collection is stated to be the first to describe Bunyan's activities in Canada. Indeed, that almost legendary Ottawa River lumber king, J. R. Booth, has a minor part in one by providing the four girls for the slightly Rabelaisian story of the melting blue ice.

The gay illustrations by Adrian Dingle are thoroughly in keeping with the fantastic legends they portray.

W. E. D. HALLIDAY

Mr. W. E. D. Halliday is Registrar of the Cabinet, Privy Council Office.

* * *

The Timor Problem

by F. J. Ormeling

(J. B. Wolters, Djakarta, \$5.00)

By virtue of many years as head of the Geographical Institute at Djakarta, and even more recently through work in the field, Dr. Ormeling is eminently qualified to approach the problems of Timor from the geographical viewpoint. While he has not provided all the answers, he has given the historical background of the present situation and has analysed the methods used developing man's environment in such a progressive manner that his systematic interpretation of these phenomena has supplied the basic over-all information necessary in the formulation of plans for future development.

He has considered man as the creative power, acting upon and changing his physical environment, but he very aptly ties in the three chief environmental factors — climate, topography and edaphic conditions — in terms of "controls" or restrictive influences on the local mode of life. In this respect, climate is considered to be the more important of the three to an underdeveloped tropical people, and thus begins his description of the physical environment with the climate.

Timor, in general, has a typical monsoon climatic pattern with winds of continental origin during the low-sun period bringing the dry season, and the contrasting humid winds of tropical seas bringing an onslaught of precipitation during the wet season. Tropical cyclones are a recognized menace in the struggle for existence, but finally it is the rainfall which decides the rhythm of agricultural activities. Relief definitely affects the distribution of rainfall and the orographic influences and the varying length of the wet season and the severity of the dry season contribute to a highly erratic character in the rainfall distribution pattern. The limiting effect of climate is notable in such matters as the carrying capacity of pastures.

Timing is of the utmost importance to the human factor. The Timorese must of necessity use the dry season for cutting, clearing and burning off their intended areas of cultivation (*ladangs*) and the fields must be ready for planting when the rains set in; therefore, fluctuations in the rainfall can seriously interfere with any planned farming program. Social life itself starts to expand with the coming of the dry season and suddenly contracts when the torrential rains of the wet season turn roads into quagmires. Even the collecting of taxes is procrastinated until the advent of the dry season.

Climate in conjunction with lithological and topographical conditions has caused Timor to be particularly subject to a strong erosion. During the wet monsoon, swollen rivers, fallen trees, gullies and boulders add heavily to soil displacement, and, during the dry monsoon wind erosion takes its toll. Man, too, has speeded up these normal processes as he interferes in the natural order of events by burning and destroying vegetation on land needed for agriculture. Misuse of agricultural lands by native Timorese has not only retarded agrarian pursuits, but has, at the same time, increased the threat of malnutrition. Another indirect result of abandoned fields and diverted clearings is the inconspicuous entrance made by the spectacular weed, lantana (*Lantana camera L.*), which threatens to engulf the island as a whole. Since it is virtually immune to fire, the plant has spread rapidly and unhindered throughout the interior.

In addition to the weed, Dr. Ormeling discusses at length other "dislocating" factors such as the Dutch administration, the influx and growth of Chinese traders and the people of Roti (immigrants from an island to the southwest).

(Continued on page XII)

(Continued from page XI)

The final units in the book are a summary statement and considerations for the future. It is concluded that the development of Timor "requires water geologists, agriculturists trained in drought-resistant crops, foresters versed in reforestation in semi-arid areas, livestock specialists, plant ecologists experienced in grass production and specialists on social problems of the farm-agent or community organization type."

The book is well illustrated with more than one hundred photographs, maps, and diagrams. The aerial shots are especially noteworthy, but the groups of miniatures lose some detail through reduction. Too, the regional maps may have been a trifle more meaningful with the proper application of geographic co-ordinates. All in all, however, Dr. Ormeling's work should, through the sheer weight of his exhaustive research alone, become a very valuable reference for those who propose further research on this or similar problem areas in the future.

SELVA C. WILEY

Dr. S. C. Wiley is head of the Foreign Geography Section of the Geographical Branch, Department of Mines and Technical Surveys for the Canadian Government.

Fabled Shore

by Rose Macaulay

(Hamish Hamilton, Don Mills. \$5.50)

The publication of a book by Rose Macaulay is always an event of importance and her latest volume is no exception to this established rule. It must be counted a very important contribution to the literature on Spain, and in a lesser degree, Portugal.

Fabled Shore is a travel book describing the author's journey from Port Bou, down the eastern Spanish coast, with numerous detours inland, through the Pillars of Hercules and on to Cape St. Vincent, clinging to the tip of Portugal. It is a unique guide book containing such a vast store of information that the reader often becomes bewildered trying to digest it all. Many patient hours of research have obviously gone into the making of this book, much of whose source material has been tracked down in volumes the average reader never heard of and probably would not have access to. Miss Macaulay describes with characteristic vividness and *élan* every hamlet, harbour, cover, rocky promontory and beach she passed, in addition to giving the origins of cities and their buildings. In closing the book, one feels that it would be possible to follow her tracks blindfolded.

But she does not merely set forth what she saw. She declares that her

book is a palimpsest of centuries and nations, layer upon layer, through the modern and mediaeval back to remote antiquity and she unearths these buried gems as an archaeologist uncovers the treasures of the past.

It is impossible to select any one section as being more interesting than another. Open the book at random and you will find some fact that could be dry but which, framed in the author's style, traps your attention and imagination. For example, Girona's present church, credited to Charlemagne, has the widest nave in Christendom . . . and Bagur is said to be inhabited by American Indians . . . and in Portugal, Olhao is famous for its spring tunny massacres. Polybius said that 'in the sea off Lusitania, acorn-bearing oaks grow, upon which the tunnies feed and fatten themselves which may well be called sea-hogs, as they feed like hogs on acorns.'

A travel book, a guide book and a literary work of high order, *Fabled Shore* will undoubtedly fire many readers with a desire to explore for themselves at least part of Rose Macaulay's route. It will also provide deep delight for the arm-chair adventurer who is less interested in cold facts than in the colourful warmth with which they are presented.

MADGE MACBETH

Madge Macbeth, in addition to writing several hundred feature articles and book reviews, has produced seventeen books. Travelling she says, has become hard work but increasing her knowledge of foreign lands is pure pleasure.

Illustrated Atlas for Young America

(C. S. Hammond and Company, Maplewood, New Jersey. \$2.95)

Here is a little book with a good idea — "to introduce the fascinating world of maps to young people". The format is simple, using a double page of illustrations or maps, and a page before and after these with explanatory text. The first of the three sections illustrates and explains the characteristics of the planet Earth, and the basic ideas of map-making and map-reading. In the second section we are given a geographic travelogue of the world. The third section purposes to "depict the story of the world from the dawn of history to the discovery of the New World, and to show the birth and growth of the United States to the present". Four pages of data are included in end papers, giving dimensions of the solar system, the earth, and geographical features like rivers, mountains, lakes and islands.

All this is attempted in one

hundred pages. As a result, generalities are used extensively, leading to many inaccuracies and ambiguities. In the section on Europe, the development of many different nations is explained by this argument, "Mountains — such as the Alps and Pyrenees — and wide rivers — such as the Rhine and the Danube — divide Europe into separate regions." The discussion of the Great Lakes contains this statement, "lake steamers carry many items, including raw materials and finished products." And from the description of Australia comes this rather surprising observation, "in summer the beaches are full of happy sun-tanned people."

The maps are mainly in the second section, and include four hemisphere maps, two of the United States, and one of each continent. The continental maps are not particularly attractive, nor do they suggest clearly the appearance of the land represented by the map. Both of these features are important in developing a child's appreciation of maps. The colours used create many difficulties. For example, on the map of North America it is impossible to distinguish Greenland from the Arctic ice pack. The last section of the book uses pictorial maps. Some are quite successful. Others are badly cluttered and contain unpleasant combinations of colours. In some cases there is no consistent use of colours. This is illustrated by the quite different colours used on two facing maps showing European colonies in America in the seventeenth century, and again in 1750.

The last seventeen pages deal with the growth of the United States. This section, and indeed, the whole book, is so slanted for United States consumption, that its usefulness for Canadian children is further limited.

SPENCER INCH

Mr. Spencer Inch is head of the Geography Department at York Mills Collegiate Institute, in Metropolitan Toronto.

More Than a Legend—The Story of the Loch Ness Monster

by Constance Whyte

(Hamish Hamilton, Don Mills, Ontario. \$5.00)

Driving along Loch Ness the visitor may see only another beauty spot in the Scottish Highlands, as was my own experience in September, 1956. Future travellers fortunate in having read Miss Whyte's book should have a fuller experience. Besides seeing a twenty-four-mile-long lake stretching like a straight ribbon through the Great Glen, they will understand its

eralties geological history, realize that much
to many it is 700 feet deep and that, though
In the and-locked, it connects with the sea
opment through the Caledonian Canal. Also
plained they will likely scan the lake in the
ains - hope of seeing the monster, and so
nces - in the large group whose experiences
e Rhine over the past 100 years are described
Europe are so vividly.

discus The first chapter describes the out-
ins this come of many attempts, some suc-
y many cessful, to photograph the monster.
als and This is to convince readers at the
in the outset that there really is a monster,
es this to the focal point of the whole book
n, "in will be regarded as fact rather than
happy fiction. The other nine chapters and
the appendix give full details of ob-
second servations made by more than 150
isphere witnesses. Incidentally, one gets an
es, and interesting glimpse of many of the
e con- highland observers themselves. Plau-
cularly sible answers are given to many
clearly questions such as: How did the mon-
repre- ster get into the Loch? Why is it so
these arely seen? Why was it famous
oping a twenty years ago but seldom heard of
. The today? How may it be related to
culties other famous monsters such as Ogo
North ogo of Lake Okanagan, British
nguish Columbia?

pack The monster's anatomy and habits
x uses are indicated by observations made
e suc- at distances ranging from twenty
attered yards to over a mile. Its overall length
ations is between twenty and fifty feet. The
is no head is wide and flat, the neck snake-
his is like and protruding from a cylindrical
erent body that seems to have humps. It
maps often travels at speeds up to thirty
meric miles an hour, with one or more
and humps barely showing. The presence
of more than one specimen is sug-
gested by simultaneous observations
in different parts of the lake.

The author makes a strong plea
that British scientists undertake a
thorough search for the monster using
modern exploratory techniques. The
present lack of interest is regretted
but considered to be a natural result
of published expert opinion that the
creature, as described, resembles no
animal known to science either living
now or in the past. She suggests that
the monster is an animal new to
science and that it has survived
through retirement in the secluded
depths of Loch Ness, from which it
only occasionally rises. Encourage-
ment for scientific exploration in the
Loch is provided by the discovery of
many animals thought to be extinct
during the past 100 years. The most
recent discovery has been the coela-
canth fish brought up accidentally off
South Africa in 1938, although con-
sidered to have been extinct for fifty
million years.

C. J. KERSWILL
Dr. C. J. Kerswill is senior scientist
in charge of Atlantic Salmon Investi-
gations at St. Andrews, New Brunswick.



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rapid grip and
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- Newspaper Features
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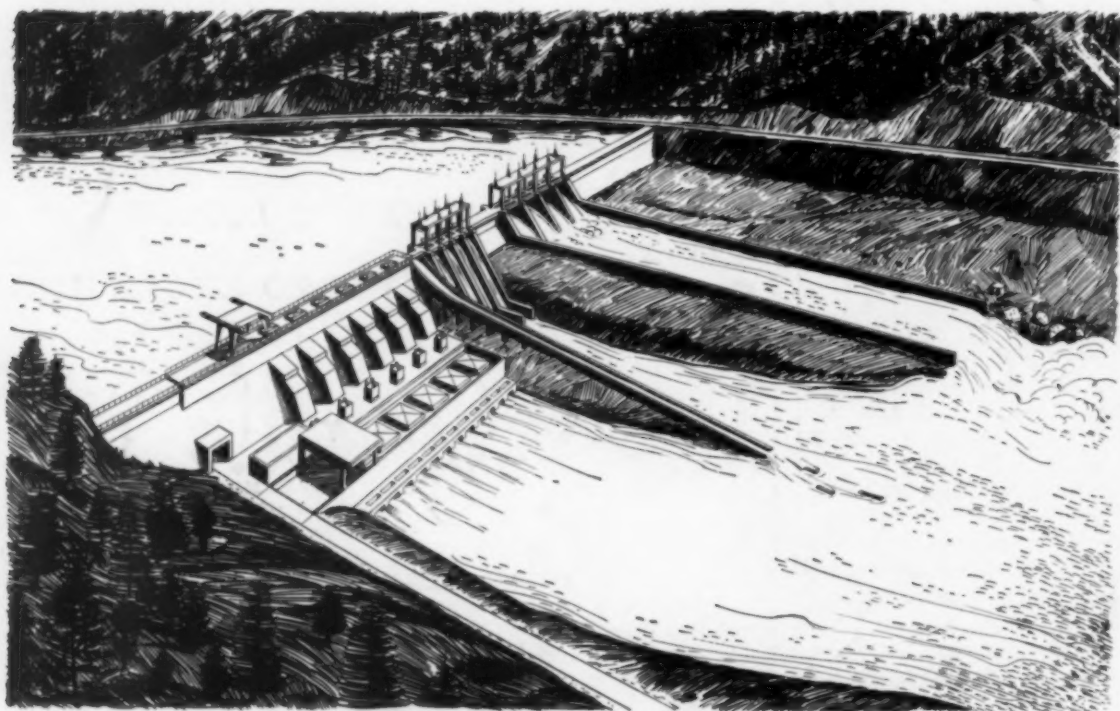
The Indian called it “MANITOU”

To the Indian, the sight of foaming rapids was an awesome mystery he could not fathom. To him it signified the presence of the “Great Manitou” — a strange, mystical power that inhabited the water, a spirit that defied his understanding. Later, modern man tamed these same waters and harnessed them to produce electricity — a power far less mystical, but far more valuable than the Indian ever imagined.

Shawinigan's chain of generating plants along the St. Maurice River brings the benefits of electric energy to a large area of the Province of Quebec. When its new 6-unit generating station

at Rapide Beaumont is completed in 1959, the total generating capacity of Shawinigan's St. Maurice River System will exceed one-and-a-half million kilowatts. Always in step with progress, Shawinigan will continue to expand its facilities to meet Quebec's increasing need for vital electrical energy.

The Indian, watching the rapids, marvelled at the miracle the “Manitou” had wrought. Today it's still a miracle — electric power, bringing comfort and convenience to home and farm, and power to turn the wheels of industry, all at the flick of a switch!



CHEMICALS • ENGINEERING
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